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INDIA'S DEMAND FOR TRANSPORTATION

BY

WILLIAM ERNEST WELD, PH.D.

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PREFACE

MUCH is being written and spoken from public platforms in India, chiefly by Indian students of economics and politics, in favor of retrenchment in railway construction. Some decry the breaking up of the village unit and the consequent destruction of the old domestic industries. Others feel that railways have made possible the exportation of wheat and so have contributed to the rise in the prices of wheat in India. The more thoughtful of the conservatives admit that railways have been a blessing to the country, but are of the opinion that the expenditure of funds for railways should be greatly decreased and the money turned into other channels; *e. g.*, expended for education or irrigation, or to subsize other industries. The writer, during his residence of more than eight years in India, has often felt that many of those who oppose the expansion of the transportation system, have done so without a comprehensive understanding of the country's need. It was with this thought in mind, and at the suggestion of H. Stanley Jevons, University Professor of Economics at Allahabad, that this study was undertaken.

The actual writing of the dissertation was not begun until the writer returned to America and entered Columbia University. He is greatly indebted to Prof. E. R. A. Seligman for his encouragement and valuable suggestions during the entire course of the preparation of this study. He also desires to express his sincere thanks to Prof. H. R. Seager and to Prof. T. W. Van Metre for reading the manuscript and for helpful criticism. Mr. Charles W. Reid, of

the Highways Transport Committee of the Council of National Defense, has very kindly placed the files and the bulletins relating to motor transport in the United States at the writer's disposal. The help, both direct and indirect, which the writer has received from his wife is the cause of his greatest indebtedness.

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INTRODUCTION

It is the writer's purpose, in the chapters which follow, to show India's need of more and better facilities for transportation. The problem will be regarded from the economic, rather than from the technical or the fiscal point of view. Methods of construction and maintenance of transportation facilities, public or private ownership of the same, rate-making and classification are subjects which will be consciously excluded. We are interested in what has happened in the past, chiefly for the sake of the future. The advisability of the extension of the means of transportation will be discussed, rather than the need of a different regulation of what the country already possesses. There are certain broad economic factors which affect the development of transportation facilities; and these, when developed, exert a reflex influence upon the economic factors. It is our intention to study these factors and influences, and their economic results.

In dealing with the factors concerned in the economic life of India, the needs of the people will ever be kept in mind. The question is not whether railways will make a profit, but whether India can afford to be without them. The welfare of the people, rather than the dividends of this or that transportation company, must be our chief concern. But profits are not to be despised, for if the investors judge that a proposed railway can never pay a profit, they will refuse to supply the necessary capital. The Government of India might guarantee a certain rate of interest on the capital invested, as has been done so many times in the history of Indian railways, and so persuade the reluctant investor to supply the necessary funds. Or the Govern-

ment might build the railway, as it has sometimes done in the past, and either operate it or lease it to a company. But if the road is built and operated at a financial loss, the result upon the people is the same, whether a "guaranteed company" or the government builds it — the deficit will have to be paid from the public treasury, and the burden of taxation must be heavier. At first sight, we seem to have injured the very ones whom we hoped to help. But the burden in taxation is relative to the ability to pay. While the per capita taxation in India is very small in amount, the burden may be heavy. India's inability to pay is very great, so that no expenditure by Government seems justified unless it decreases this inability to pay. The first public expenditures to be made should be those which would enable the people to pay the increase in taxes and have the largest surplus, whether this be expressed in health, wealth or happiness. Every self-respecting government must ask itself this question: "What expenditures will be most beneficial to the people?"

No one who knows India would call the average Indian prosperous. So much has been written regarding the poverty of this country that the world is well persuaded of its reality. Careful investigations have been made and many statistics recorded; but there is still much to be done in the study of family expenditures in the different classes—especially in the villages. Village conditions vary with the quality of the soil of the surrounding country, the possibilities of irrigation, the extent to which the cultivators are in debt to the village money-lenders, and the means of transportation. If a study of village conditions is to have scientific value, the area of land and the number of families investigated must be sufficiently great to render the conclusions reliable with reference to that particular locality or district. This kind of investigation requires effort on the part of a

considerable number of people, all of whom have been previously trained as to what facts to look for and record. After the study has been made, the conclusions may be true for the area covered in the investigation, but may not be typical of the conditions in other parts of India. One of the studies made in recent years which seems to have been made with care, was that of an Indian Civil Service officer in Bengal, who feels that the results are fairly typical of conditions throughout India.[1] If the estimate errs, it is probably on the side of optimism. One of the tables prepared by Mr. Jack and his staff is as follows:

FAMILY INCOME IN FARIDPUR (*5 members in a family*)

Those living in		*Annual Income*	*Dollars*
Comfort	49% of families	Rs. 365	$122
Below comfort	28% of families	Rs. 233	$ 77
Above indigence	18½% of families	Rs. 166	$ 55
Indigence	4½% of families	Rs. 115	$ 38

(Rs. is the abbreviation for rupees. Three rupees approximate one dollar).

Mr. Jack then turns to the question of family expenditures in Faridpur District.[2] It is to be noted that the expendi-

[1] Jack, J. C., *The Economic Life of a Bengal District* (Oxford, 1916), p. 81.

[2] It is interesting to note how the two lists of expenditures bear out Engel's conclusions with reference to Saxony, published in 1857. He concluded that with increased incomes, there would be a smaller relative percentage of outlay for food; the percentage of expenditure for clothing would remain about the same; the percentage for rent, lodging, and for fuel and light would remain the same; and that higher incomes would show a much greater percentage of outlay for sundries. The percentages given below are based on the total expenditures in the two lists:

	Percentages of total outlay for those in comfort	*Percentages of total outlay for those in extreme indigence*
Food	62	74
Clothing	10	10
Rent and Repairs	12	8
Sundries	16	8

The difference in rent percentage might be due to the inclusion by

tures in each class do not equal the entire income for the year.

Items of Expenditure	*Amount spent annually by family in comfort*			*Amount spent annually by family in extreme indigence*		
Food	£	s	d	£	s	d
Rice	8	0	0	4	0	0
Salt		2	8		2	
Oil		8	0		4	
Spices		5	0		2	0
Fish		10			3	
Pulses		10			3	
Vegetables		4			2	
Milk and Butter		6			2	
Other Necessities						
Betel nut		4			1	
Kerosene oil		2	8		0	6
Tobacco and Molasses		5	0			
Clothes	1	13	4		13	4
Household Utensils		3	0		2	0
Petty House Repairs		10	0		3	
Rent		7	8		2	6
Local Taxation		2	0			6
Medical Expense		15	0		2	6
Furniture		10	0			
Thorough House Repairs	1	0	0		5	
Domestic Festivities and Entertainment		15	0		5	0
Unaccounted for	7	11	8		16	8
Total	24	5	0	7	10	0

From these tables one can form a fairly accurate conception of the poverty of the people of India. This is not due, as might be supposed, to over-population. It is due in part to an uneconomic distribution of population. Many other explanations, however, have been given for the economic weakness of the country; namely, the benumbing force of

Mr. Jack of the rent for the land cultivated by those living in the house. The difference in repairs to the house would account for a part of the divergence. The poor make their own repairs.

caste, the lack of a universal language, the crime of hoarding, the debility of the people owing to the trying climate, the terrible ravages of plague, cholera and famine, the lack of "Permanent Settlement" of the land throughout India. the lack of a high protective tariff, the so-called "Drain" from India to England, the exportation of wheat from India, and the lack of universal and compulsory education. Each of these reasons has been offered by educated Indians at different times and places. There is no single solution of the problem of poverty in India. In its origin, the prosperity of a nation depends upon its natural resources and upon man. That the natural resources of India are sufficient, if properly developed, to maintain the three hundred and twenty millions of people in as fair a measure of comfort as is enjoyed by most of the peoples of Europe, is rarely if ever questioned. India's resources are great, but they are not developed.

If it is true that the resources if India are not developed, we are driven one step farther back to find the cause of the nation's poverty. Both official and unofficial opinion admits two things: first, that the farmers and cultivators should benefit by the advances in modern methods of agriculture; and secondly, that the country is greatly in need of other forms of industry besides agriculture. Two-thirds of the people are directly dependent upon the soil. Of the two needs mentioned above, it is our purpose to put especial stress on the second — the need of new industries which must be carried on along lines used in the factory production of the West. That such industrial development has not already occurred in India has been due to either a lack of desire or a lack of ability on the part of the Indians themselves to make the most of the natural resources of the country. It has been true in the past that the thoughts and the desires of the leaders of the people have not been along

industrial or commercial lines. Besides this fact, the experience of the people for centuries taught them to respect an uncertain future, and men learned that the way to have wealth was to hide it. Foreign invasions, inter-state wars and civil strife led the people to take as little chance as possible in an uncertain future. In the large centers of trade this lack of confidence in the future is beginning to pass away, but it still lingers in the villages. The educated people realize, as never before, that factory production must come to India. The lack of desire to develop the resources is gone, but the lack of ability is still present. Much of the industrial capital that has been invested has been that of foreigners, and the industries have had foreign management. The factories that have been started by Indians with Indian capital and under Indian management have usually failed. Some of them have been reorganized and have failed the second time. There are some conspicuous exceptions [1] but they are few in number. The underlying causes of the failures are evident: first, a lack of technical knowledge of the commodity produced and its methods of production; secondly, a lack of realization of the importance of skilled and experienced foremen, and an unwillingness to pay a sufficient salary for such leadership in order to obtain and hold it. A secondary cause is the inability to compete in the open market with goods made abroad, chiefly in England, Germany, Java and Japan.

[1] The most outstanding exception is that of the Tata Iron and Steel Co., Ltd., which was registered in August, 1907. It has had a splendid career. Before the corporation was launched, Rs. 550,000 was spent in investigation. The average number of employees for 1917 was 10,225, including both men and women. The annual report of the Company for the year ending June 30th, 1919 showed a net profit of Rs. 11,000,000. The causes of this phenomenal success seem to be: abundant supplies of iron ore and coal, the willingness to pay well for skilled management, a great demand for the output, and wise and careful management. The company voluntarily reduced the labor shifts from 12 to 8 hours.

India imports goods from other countries in considerable quantities, but much of the total does not compete with goods made in India. The commodities, in the production and sale of which the country feels the effects of foreign competition most strongly, are cotton goods and cotton yarn, silk, sugar, glassware, matches and small articles of hardware. Indigo would have to be included were we not considering more recent years. The decline of the natural indigo industry began with the putting of synthetic indigo on the market in 1897. This decline has been consistent until the outbreak of the War brought about at least a temporary revival of the industry. The most important imports are cotton goods and cotton yarn.[1] These two items comprise 35.3% of the total imports. If sugar, most of which comes from Java, be included with the two just mentioned, then the percentage of the total for 1916-17 becomes 45.6%. The distressing fact, regarding these three most important of India's imports, is when viewed from the standpoint of natural resources, that India is well equipped to produce them all. Cotton grows readily in the country, and India was first in the field in production and exportation of cotton goods in very early times. As for sugar, this country is the largest producer of sugar-cane in the world, yet the imports of manufactured sugar are increasing, and the indigenous production is barely holding its own.

The explanation most frequently given for the nation's economic weakness is lack of education. Education is very necessary for India's progress. So far, all of the agencies of education, whether religious or governmental, have scarcely made more than a beginning. The reason why a system of education has not been developed which is commensurate with the need, is a much discussed point; and

[1] *Indian Year Book* (Bombay, 1918), p. 269.

the Government of India has, on this account, received a considerable amount of blame, both in India and in England. To enter into the question of the allocation of responsibility would take us too far afield, and besides, we are more concerned about the future than the past.

The proposals for constitutional reform made jointly by the Secretary of State, the Right Hon. E. S. Montagu, M.P., and the present Viceroy of India, Lord Chelmsford, have not been welcomed by many of the Indian leaders, because they are considered to be much too moderate in the devolution of powers, and in the granting of home rule. The point of transference of authority is to begin with the Provincial Governments, and the devolution is to be progressive. It is too early to draw conclusions as to the results of this transference of authority, but in one particular we can be reasonably certain — there will be an expansion of the educational system. The Indian leaders are pledged to such enlargement of the present scheme as will make education within reach of the masses. In this the leaders will have the support of the entire educated community of India. The evidence of this can be found in the debates before the Viceroy's Council and in the discussions which preceded the presentation of the so-called Gokale Bill in 1913 when feeling ran high among the educated classes. It will be a long, up-hill task to educate the masses in India, for the difficulties are fiscal, social and economic; but the effort should be and doubtless will be made in the near future.

A number of writers and public speakers, in both England and India, appear to hold the opinion that universal elementary education would, of itself, solve the problem of India's economic weakness. This can not be taken for granted. The histories of the most advanced nations do not prove to us that economic strength has always waited

on education; but rather that some degree of economic development has frequently led the way and pointed out the indisputable advantages of education. Might it not be as true to say that the lack of general education in China and India has been due to the fact that the peoples of these nations have not really grappled with the problems of developing their natural resources, as to say that the resources have not been developed because of the lack of education? Again, India's own experience in education has led many careful observers to question the proposition that the economic development of the country has been waiting for education. There are, in round numbers, 8,000,000 students under instruction, including the boys and girls in both public and private institutions. Thirty years ago there were 3,340,000.[1] During the last generation we have seen a gradual increase in the number of students in the schools, and we have had some opportunity to study the reaction of this training upon the economic life and the industrial development of the country. While the degree of expansion of the industrial life during these thirty years would be an uncertain measure of the effects of education upon industrial development, yet we have a more accurate way of judging; namely, by the number of students who enter occupations which bear directly on this important matter of developing the natural resources of the country. A well-known writer on Indian subjects says on this point:

No native of India, educated solely in his own country, has yet produced any work of original merit in any of the subjects taught in our colleges, nor has our teaching brought forth fruit in the application of western science to Indian problems. Indian history and Indian archaeology have been enriched by few contributions from Indian students, and little has so far

[1] *Indian Year Book, op. cit.*, p. 425.

been done by natives of the country to adapt and apply the experience of the west to the development of the material resources of India.[1]

While that part of the above statement relating to the contributions to general knowledge by Indian students, should be called in question, yet the latter reference to the lack of contributions made by the college graduates towards the development of the material resources of the country is all too true. The majority of the graduates go either into the legal profession or into Government offices, both of which vocations are filled to overflowing. Only a few of those trained in school and college return to the soil, and the majority of those who do, are landowners. Very few go into business, whether in the form of manufacture or of trade.

Our conclusion must be, therefore, that the development of the resources should at least keep pace with the growth of the educational system. There is an interaction of forces between educational and material progress, each assisting the other.

To understand India the western mind must realize that village economy still lingers there. Small entering wedges have been driven which tend to break up the village as an economic unit, but the dissolution has not yet taken place. The situation is not unlike that which obtained in Europe under the domestic system of production. There is this difference, however, that in India, agriculture is the main industry. The time was when India possessed considerable domestic industry in the form of cotton weaving, but foreign competition has practically put an end to it. Even remote villages have been entered by foreign cotton goods.

[1] Strachey, Sir John, *India, its Administration and Progress* (London, 1911), p. 281.

The factory-made goods of England are both smoother and cheaper than those produced in India by the remnant of the domestic system.[1]

That these industries which formerly flourished in the homes have disappeared, is a real grief to many of the friends of India. There has been an effort on the part of such well-known and popular leaders as Mr. Ghandi and Mr. Polak to revive them. While their intentions are excellent, their efforts are worse than futile. India cannot contend against the inevitable. She must take her place, as Japan has done, in the ranks of organized production. Even if the Swadeshi Movement should succeed in binding a large part of the people together into a consumers' monopoly for Indian goods, yet domestic industry would not live.[2] There are already 266 mills for the weaving of cotton goods in India, which number is an increase of 49 over the number of ten years ago. There will be many more in the future, and sooner or later factory production in India will drive domestic production out of the field. In short, it will not be a case of the domestic system competing against foreign goods, but the domestic system against the factory system.

The village, while still remaining a unit in production and in most of its consumption, now imports foreign cloth and to a less extent, sugar. These commodities, as well as others, must be paid for by the hard-earned fruits of the

[1] "The essence of the domestic system consists in the fact that while the workman still owns his own tools and conducts the work in his own home, often with the aid of his family and in connection with some agricultural activity, he no longer disposes of the finished product." Seligman, E. R. A., *Principles of Economics* (New York, 1916), p. 93.

[2] The Swadeshi Movement is supported by Indians who are particularly zealous for India's industrial progress. One feature of the movement is that its members refuse to buy any other goods than those produced in India.

soil. If all the land were wonderfully fertile, and the monsoon rains absolutely dependable, then it might be advantageous for India to give its entire attention to agriculture and to import other commodities from abroad. But this is not the case. Modern methods of agriculture and irrigation will help to strengthen India's economic weakness, but modern industries are necessary to furnish a balanced economic life.[1] A portion of the vast population can be spared from agriculture to develop the industrial life of the nation.

There is one prerequisite for the extensive development of the material resources of India; namely, adequate transportation facilities. History shows us a double possibility as to the relation existing between means of transportation and industries: sometimes the industries may be said to have created the means of transport, as in the early history of railways in England; it is more common to find that facilities of transportation have made industries possible, as was the case in the development of the western part of the United States. If industries are to bring railways into existence, they must be fairly well developed and managed by wise and experienced men who are able to control large amounts of capital. This is not the situation in India, where industrial development is stunted, and captains of industry few, and capital very timid in showing itself. So, means of transportation must precede industrial development if the country is to take its place among the progressive nations. Something has been done, but much more needs to be done. The necessity of adequate means of transportation for industrial development appears, whether the question be attacked from the point of view of economic theory or from that of practical life. Both of these points of view will be discussed in the following chapters.

[1] *Cf.* Fairbairn, Henry, *The Political Economy of Railroads* (London, 1836), p. 106, *et seq.*

CHAPTER I

The Economics of Transportation

Transportation may be defined as the carrying of persons or goods from one place to another for the sake of a material reward. Transportation has come into existence as a means of partially overcoming the limitation of man due to the distance between localities. The economist is interested in the overcoming of distance for gain. This gain may be either direct or indirect. Direct gain will be in the form of profits to the owners of the means of transportation. Indirect gain is realized by those who use the means of conveyance, either for the shipping of goods or for the conveyance of themselves or their agents. If direct gain is impossible, then the means of transportation must be built by governments or public-spirited individuals, in order to obtain the indirect gains. There should be, in the course of time, a reflex action from indirect gains toward direct gains.

The need for transportation has arisen from the unequal distribution of the natural resources of the earth. Because of this unequal distribution of natural resources, the commodities produced in different localities differ in kind, quality and quantity. This unequal distribution is expressed in different physical characteristics: the difference in the physical and chemical qualities of the soil and sub-soil, the differences in climate, the differences in elevation and the differences in the location and character of the water supply. These four physical characteristics are to some extent mutually related to one another, but taken together they are the natural causes of the differences in kind, quality

and quantity of the goods produced in different localities. Then when man is taken into account, with his differences in intelligence, training, tastes and skill, the diversity of the production of different localities becomes still more pronounced.

This inequality of the apportionment of material resources to different localities has had a great influence upon the distribution of population. The primary force which first led men to settle in different localities was the search for material goods with which to supply their physical wants. In the early stages of man's history, it was more usual for him to go to the things which supplied his wants, than it was for him to have the commodities brought to him. When man reached the more stationary stage, and began to till the soil, he naturally selected the locality where the natural resources were most abundant. In his weakness, he needed all the assistance from Nature that he could obtain. Later, many other things entered into his choice of a home: the desire for religious or political freedom, the attraction of a settled community, love of family, and other considerations. But of the various influences affecting the distribution of population, the economic one is the most important, if long periods of time be considered. The share of the individual is dependent upon the ratio existing between natural resources and the number of people who share in them. When the individual share becomes small, we see some shifting of the population.

The final development which affects the location of men and so reacts upon the demand for transportation is the use of capital in production. It is true that a certain degree of development of transport must already have taken place or modern capitalistic production could not have been brought about. But given this amount, the demand for transportation is greatly increased by the investment of capital.

If the need for transportation depended solely upon the unequal distribution of the world's natural resources with the resulting distribution of population, the demand for transportation would be much easier to satisfy than it actually is. Capital invested in factories and transportation facilities has led to a localization of population and materials at certain centers, which are frequently near the natural resources or motive power required.[1] Facilities of transportation were required to make this degree of localization possible; and further means of transport will be required to maintain the development of the industries. But there is a strong tendency to localize certain industries at points of artificial rather than geographical advantage because the former are becoming more important than the latter. As far as the costs of transportation are concerned, the choosing of a place of artificial advantage is attended by certain savings in one direction and certain increased expenditures in another.[2] If the factory is built in proximity to the source of the most necessary raw material, the other materials of production have to be conveyed to this place of more or less accessibility, and the finished product has to be shipped from this place to the distributing centers. On the other hand, if the factory is located in a large industrial center there will be an increase in the cost of transportation of the chief raw material, which may, however, be offset by savings in the costs of transportation of the other materials of production. But the important

[1] This localization of industry is due in part to other accruing advantages, in which transportation plays only an incidental part. These other advantages will not be discussed here. *Vide*, Ely, *Outlines of Economics*, 3rd ed. (New York, 1917), pp. 128-129.

[2] *Vide Traffic Geography*, Ketchum, E. S. editor (Chicago, 1915), *Introduction*, p. 3. An explanation is here given of the reasons why Gary, Indiana was chosen as the center of the U. S. Steel Corporation.

reduction in most cases, is found in the transportation costs of marketing the finished product. The comparative costs of conveying the raw material and the finished commodity will play an important part in deciding whether an artificial or a natural location is to be chosen.

THE ELASTICITY OF DEMAND FOR TRANSPORTATION

Transportation may be divided according to the objects to be carried, into two classes: freight and passenger transportation. Passenger traffic may again be divided into those who travel from an economic motive and those who travel for some other reason. The transportation of goods will first be discussed, with special reference to the *elasticity of demand* for their transportation.

The cost of a finished commodity may include: (1) the price paid to the producer, at the place of production; (2) the cost of conveying the article from one place to another.[1] The latter includes not only the price paid for actually conveying the article but also the interest on the money paid to the producer as the price of the commodity, such interest being proportionate to the length of time elapsing before the commodity is delivered to the consumer. To this must be added the insurance charges against loss or damage during transport. It does not follow that these charges are always paid by the consumer. Transportation, therefore, is as much a feature of production as agriculture or manufacturing; and in the long run, the demand for commodities will determine the demand for transportation facilities.

THE DEMAND FOR TRANSPORTATION OF GOODS

The subject of the elasticity of demand for transportation with reference to its relationship to the elasticity of demand for goods may be approached from either of two

[1] *Vide* Lardner, D., *Railway Economy* (New York, 1850), p. 30, *et seq.*

sides: the effects upon the demand for transportation of changes in the prices of commodities not due to transportation costs; and the influence of increases or decreases in transportation rates upon the demand for commodities. The elasticity of demand for goods is governed by certain well-known principles: luxuries have a more elastic demand than necessities; novelties have a higher degree of elasticity than the things we are accustomed to enjoy, especially if the use of the latter has become habitual; the demand of poor people has a greater elasticity than the demand of the rich; and when there are substitutes for a commodity, the elasticity of the demand for it is increased. As transportation is one of the factors in the cost of production, it follows that if the price of a commodity increases and the amount demanded decreases, the demand for transportation will also decrease. So the demand for transportation is indirectly subject to all the different influences mentioned above, which affect the elasticity of the demand for commodities. This reaction will not make itself felt at once with all commodities. In short periods of time, if there should be an increase in the amount of a commodity demanded, because of a decrease in the price, the effect upon the demand for transportation would depend upon the amount and the location of existing stocks, and the extent to which the existing factors of production could be made to increase their output without delay. In longer periods of time, if the increase of demand remained constant, sufficient time would have to elapse to allow new forces of production to make their contribution to the supply, before the full demand for transportation facilities would be felt.[1]

When we approach the subject of the elasticity of de-

[1] *Vide* Marshall, Alfred, *Principles of Economics* (London, 1916), p. 374, *et seq.*

mand for transportation from the other side, *viz.*, the result of an increase in the rate for carrying commodities upon the demand for the commodities themselves, the situation is more complicated. An increase in the rate or cost of transportation will mean an added expense in production, which will tend to raise the price at which the good is offered to the consumer. All that has been indicated above as to the elasticity of demand for commodities will apply here. If the demand measured in the amount of the commodity decreases, there will eventually be a proportionate decrease in the demand for transportation.

The effect of an increase in the rate of transportation upon the final price of the commodity will depend upon how important a part transportation plays in the production of the commodity.[1] A great diversity appears when various commodities are examined to discover the part transportation has played in their production. In some cases the entire value of the commodity to the consumer is due to transportation; as in the case of sea-weed cast up on the shore by the tides, and from there hauled to a nearby farm to be used as fertilizer. Again, the value of material in its original place may be a minus quantity; that is, the commodity may be a nuisance, and after being transported may be sold to the consumer for less or more than the cost of the transportation. This is common in large cities where the city refuse is sold for fertilizer.[2] But to turn to the more important situations of economic life, we find modern industry so highly complex and specialized that production is carried on in separate units of production, each of which makes its contribution towards bringing the materials into a finished state. The means of transport form

[1] *Vide* Knoop, Douglas, *Outlines of Railway Economics* (London, 1913), p. 18.

[2] Lardner, D., *op. cit.*, p. 29, footnote.

the connecting links between them. To obtain that part of the final cost price of a given commodity which is due to transportation, we must estimate the total cost of conveying the goods from unit to unit, and from the final unit to the consumer. If this were the only contribution made by transportation to the cost of production, the estimate could be made of that part of the cost which is due to transportation charges, even though the finished commodity contained a number of different materials. But to know the complete part played by transportation, we are compelled to measure the contribution made by transportation within each unit or factory. Here we are not only concerned with the actual materials that go into the finished commodity, but with the part played by transportation in assisting both capital and labor. Each machine in each factory along the line of progress of a particular good, from the point of origin to the point of consumption, has its own line of development, with units of production located on it, in which transportation has played its part in making the use of capital possible, and in bringing labor to the place where work is to be done.

It has been noted that the demand for transportation tends to fluctuate with the varying demands for commodities at varying prices. It has also been pointed out that a change in the rate charged for transporting goods will tend to cause a change in the final demand for transportation in accordance with two factors: (1) the extent to which transportation plays a part in their production; and (2) the elasticity of demand for the goods concerned. To continue the analysis, it should be known what elements are inherent in the transporting of goods which make the conveyance charges an important part of the cost of production. Three of these elements are: the ratio existing between bulk and value, the distance goods are carried, either

in their finished or unfinished state, and the importance of the time element as seen in the case of perishable commodities.[1] In examining these elements, the intention is to keep the subject of the demand for transportation in the foreground as much as possible. However, there is no such thing as economic demand independent of a price, and there is no such thing as elasticity of demand independent of varying prices. As changes in the rates of transportation influence the cost of production of commodities, and so affect the prices at which they are put on the market, the result is that the demand for the commodities as well as for transportation is affected. Therefore, it is necessary to understand these factors which play an important part in determining what portion of the cost of production is due to transportation charges.[2]

THE EFFECTS OF BULK AND WEIGHT UPON THE DEMAND FOR TRANSPORTATION

If transportation is required in the giving of form, time or place utility to commodities whose bulk or weight [3] is great, in proportion to value, the cost of the transportation

[1] To these three factors a fourth might be added: the increased charge made by railways for articles of high value. The charge is quite independent of the bulk of the goods, and is independent of the actual cost to the road of carrying the particular goods. It is levied according to "what the traffic will bear," but is supposed to react favorably upon other rates. The extent to which it does so react, is important to the economist as well as to the maker of rates. However, for this study, it is not of great economic significance.

[2] Rate-making and differential charges are not our chief interest here. We are willing to take the rates and their changes for granted in order to focus the attention upon the effects of higher and lower rates upon the demand for transportation.

[3] The two characteristics of freight, *i. e.*, bulk and weight, might well be treated separately, but the use made of the conclusions permits treating them together. They affect the cost of transport in a similar way.

is likely to be an important part of the cost of the commodity. This is intensified when "distances are great." Even though "exceptional rates" are made to favor this kind of goods, yet it remains true that the cost of conveying the goods will be an important part of the total costs.[1] Quarried stone, gravel, lime, slate, iron ore, coal, lumber and many forms of agricultural produce are examples of commodities, the price of which may be much greater at the place where the goods are to be used, than at the place of origin. Much of this difference in price can usually be attributed to the costs of transportation.

The effect of reducing the cost of transportation by introducing more effective means, or of lowering the rate on existing means of transport for commodities whose bulk or weight is great in comparison to value, may be considered in either one of two possible ways: the lowering of the price in the market of those goods which would have been transported, if the cost of conveyance had not been decreased; and the shipping to a new market of those commodities which could not have been shipped with profit, if the rate had not been reduced.[2]

In the first case, the goods would have been shipped even if the rate had not been lowered; so there will be under competitive conditions a reduction in price of the goods equal to the reduction in the rate or the cost of transportation. This reduction in price will bring about an increase

[1] In this connection, it is necessary to distinguish between the original forms in which the material of a commodity exists, and the later forms. When the process of production continues in a series, it may be the case that other factors besides transportation are the chief determinants of value; *e. g.*, transportation is an important element in the value of steel rails, while it has much less importance in determining the value of watch-springs.

[2] *Vide* Colson, C., *Railway Rates and Traffic*, translated from 3rd ed. (London, 1914), p. 149.

in the amount of the commodities demanded and so affect the demand for transportation. The increase in the amount of goods which markets are willing to buy at the lower price will depend upon the elasticity of demand for the commodities; and the demand for transport will be also, in the long run, proportionately increased. So with respect to the transportation of heavy or bulky commodities, the economic forces operate in the same general way as upon other goods, the difference being one of degree. As transportation costs are such an important factor in the costs of bulky or heavy goods, it is evident that any substantial decrease in the costs of conveying them would result in a greater reduction in price than would be the case with goods whose bulk is relatively less. Therefore, if two commodities have equal value and equal elasticity of demand, but the value of one is in compact form and the other is not, a general reduction in the cost of transportation should create a much greater increase in demand for transport of the bulky commodity than for the transportation of the other.

In the second instance, the demand for transportation of goods which would not have been consigned if the costs had not been lowered, is a net increase in the total demand for transport. The extent of the increase in the demand for transportation will depend upon the demand for the commodities at the price at which they can be put upon the market.[1] This price, in the case of great bulk to low value, will materially depend upon the extent of the reduction in the rate of transportation. In case of future reductions in the costs of transporting goods, we will have the same cycle of causes and effects as outlined in the paragraph above.

The part that has been played in the industrial develop-

[1] We are presupposing a sufficient supply to meet the demand at this price.

ment of nations, by such reductions in the cost of transportation, has been very great. There are two outstanding reasons for this fact: the reductions in cost have been great, because the modern means of transport are so much more efficient than the more primitive ones;[1] also, the closer to its original source a good may be, the more likely is its bulk or weight to be great in proportion to its value. Primitive people do not extensively apply capital and labor to the product of the mine and soil, and so add value to the original material. The result is that a large part of the production of undeveloped nations is likely to be bulky in ratio to its value. Yet we have seen above that it is this kind of goods which is most affected by reductions in the cost of transportation. As such commodities are the very basis of industrial development, and cannot be evenly distributed over the country, their conveyance becomes the absolute prerequisite for such development.

DISTANCE AND THE DEMAND FOR TRANSPORTATION

The varying distances which goods must be carried affect the market prices of commodities and so cause a reaction upon the demand for transportation. This subject is not to be considered independently of the previous one; *viz.*, bulk or weight in ratio to the value of the goods; but the former is coördinate with the latter as one of the variable factors which influence the demand for goods, and indirectly, the demand for transportation.

We have seen at the beginning of this chapter that the goal or object of transportation is to overcome the limitations due to distance, which have come into existence because of the unequal distribution of the natural resources of the earth, and have been intensified by the inequalities

[1] *Vide* Kirkaldy, A. W. and Evans, A. D., *History and Economics of Transport* (London, 1915), p. 3.

of the distribution of population and capitalistic investment. In no industry has science made greater advances than in those which seek to overcome distance, whether on land, on the sea or in the air. Yet it is still the case in transportation, that additional distance means increased expense,[1] although usually the increased expense is not in proportion to the distance. Even though the charge per ton-mile for long hauls may decrease with the increase in the distance, yet where the commodity is at all bulky (in proportion to value), transportation costs usually constitute a considerable part of the costs of the commodity.

A decrease in the cost of transportation over long distances, whether by the introduction of better facilities, or by lowering the rate of existing means of transport, will have the same effect as in the case of bulky or heavy goods: under competition, the degree to which the price of the goods will be lowered will depend upon the amount of the reduction in transportation rates and the importance of transportation in the production of the goods. The greater the part played by transportation in determining the price of the commodity in any market, the greater the effect the reduction in transportation costs will have in lowering the price of the commodity.[2] The more the price is lowered

[1] The application of the "postal principle" is, of course, an exception to the general statement made above. Where the "zone system" is used, another exception might be pointed out within the zones. Sometimes under competition the long way does not mean a more expensive way. But these are exceptions which could never become the rule. *Vide* Kirkaldy and Evans, *op. cit.*, pp. 124, 125; also Colson, C., *op. cit.*, p. 190, *et seq.*

[2] To take a purely hypothetical illustration where distance counts; if a pair of shoes, made according to the modern machine system of production and territorial division of labor, cost in the market, $10, and 50% of this cost is due to transportation charges on the hides from Argentina, and domestic shipping charges, then a 10% reduction in the transportation charges would result in lowering the price of shoes to

the greater is the quantity demanded. The increased demand for transportation will depend upon the degree of response on the part of the consumers to this decrease in the price of the commodity, whether it be great or small.

The diminution of the cost of transportation and the consequent reaction, through the demand for goods, upon the demand for more transportation, will have certain effects upon the intensity and extensity of the market for the goods concerned. It may cause an increase in the distance which the goods are carried, or an increase in the quantity of goods carried for a certain distance, or both.[1] If the reduction in the cost of transportation be considerable, the market for those goods in the production of which transportation is an important factor and the demand for which has some degree of elasticity, will be extended over a wider area. An extreme example of the lowering of costs of conveying goods would be the substitution of a railway for an ordinary dirt road and animal-drawn carts or wagons. The goods will then flow from the places of origin to the places of greatest demand along the railway. The distance to which the market will be extended will be dependent upon what the consumers are willing to pay, including transportation charges, to become possessors of the goods.

If the new line of railway, in the illustration above, is built through a country in which the means of transport are limited to the new line, then the market will be extended by the length of the line, provided the cost of transportation and the costs of production are not prohibitive.

$9.50. But under the old system where hides were produced at home and tanned locally and made up by the village shoe-maker, the transportation costs might be only 5% of the total costs. In this case, a 10% reduction in transportation costs of a pair of shoes selling for $10 would lower the market price to $9.95.

[1] Lardner, D., *op. cit.*, p. 254.

If the reverse is true, and the country through which the railway runs is closely filled with effective "feeders" and spur lines, then the market will not be extended in the simple ratio of the new radius of the railway but in the ratio of its square.[1] Therefore, no country has really provided itself with sufficient means of transport which has limited its operations to the building of trunk-lines.

PERISHABLE COMMODITIES AND THE DEMAND FOR TRANSPORTATION

The distinguishing characteristic of goods of this class is that the time element is predominant. Because of this fact, the demand for transportation in general, and speedy transportation in particular, is very great. Of the four requirements for effective transport, *i. e.*, cheapness, speed, regularity and safety, the first three apply in a special way to the need of conveyance for perishable goods. The chief classes of goods of this sort are fruit, vegetables, milk, eggs, meat and fish. The need for *cheap* transportation is due to the fact that most of the articles are necessities.[2]

[1] Let us conceive of a section of trunk-line connecting two terminals, which are 90 miles apart. This section is ideally equipped with "feeders," running at right angles to the main line and furnishing transportation facilities, at the same rate as the main line, to all the surrounding country. At one of the terminals, a commodity is produced, to obtain which the consumers are willing to pay the original costs plus 90 miles of transportation, but no more. The market for the goods would then assume the form of a triangle, bisected by the main line, with the base of 180 miles at the terminal where the commodity is produced, and the apex at the other terminal. The area of the triangle would be equal to the length of the section of trunkline squared. *Cf.* Roscher, W., *System der Volkswirthschaft* (Stuttgart, 1887), vol. iii, p. 374; also Marshall, Alfred, *Industry and Trade* (London, 1919), p. 27.

[2] The reasoning here is the same as in the case of taxation. Modern governments do not tax necessities. A high rate for transportation of necessities would have the same effect upon the poor, as that of the old English "tolls" on conveyances.

Regularity is required by both producer and consumer, for the former will not produce a surplus of milk, eggs and vegetables unless he is reasonably sure of a regular market. The consumer needs these articles as daily food. Speed is the outstanding requirement for long hauls, and this has been only partially reduced by the modern methods of cold-storage, canneries and refrigerator cars. The additional expense to the transporter of such goods arises from the necessity of giving the right of way to them, coupled with the inability to combine such commodities in a trainload with goods which are to be hauled more slowly. This additional expense may be due to the use of special cars. The speed factor seems to have been neglected until recently in the analysis of operative costs, at least in the United States.[1]

Approaching the subject of the demand for transportation from the side of the producer of perishable goods, we find him laboring under a double difficulty. Firstly, he is not able to accept slower substitutes for rapid transit if the cost of the latter is very great. If he is unable to procure cheap, rapid and more or less regular transportation for his surplus produce of perishable goods and is unable to find a local use or market for it, his loss is immediate and total. He is limited in his choice of the means of transportation. Secondly, he is not able to bargain effectively with the agents of transportation because of the perishable quality of his goods. This is due to the fact that the prices of such goods are, at any one time, more influenced by the demand than by the cost of production. If the packing and shipping charges, and the commissions of the whole-

[1] *Vide* Cunningham, W. J., *The Accomplishment of the U. S. Railroad Administration in Unifying and Standardising the Statistics of Operation*, Annals of the American Academy of Political and Social Science (Philadelphia, November, 1919), p. 46, *et seq.* Mr. Cunningham here treats of the time element in operating statistics.

saler and retailer should be greater than the price the consumer will pay for definite quantities, then the producer will not ship his goods; for the difference between the selling price and the marketing costs would only increase his loss on the costs of production. But if the marketing expenses fall slightly below the price at which the goods can be sold, then the producer will ship the goods in order to reduce, as much as possible, his loss on production costs. Because the producer is not able to play the future off against the present, the demand for transportation for perishable goods is more insistent and less elastic than for other goods.[1]

The consumer's demand for the goods under discussion, in so far as they are necessities, tends to be inelastic. But as the most imperative needs of the individual are met, his demand for more of any commodity acquires a greater degree of elasticity. The upper reaches of the demand-curves for milk, eggs, vegetables and some meats are likely to be steep, while they tend to flatten in their lower extent. Having purchased some, the buyer questions the advisability of purchasing more at the existing price. In advanced countries, substitution is so commonly practised in the case of foodstuffs that only in one or two instances can the demand said to be highly inelastic. While realizing that the elasticity of demand for perishable commodities differs with the different kinds of goods, and with the wealth of the consumers, yet it can be said that the amounts demanded of them all do change considerably with variations in price.

As the demand for transportation is dependent upon the quantities of the goods demanded at different prices, the effect of the lowering of the costs of transportation upon the demand for conveyance would in turn depend upon the importance of conveyance charges in determining the mar-

[1] *Vide* Marshall, Alfred, *Principles of Economics*, pp. 348-349.

ket prices of the perishable goods. What would be true in the United States, as to the importance of transportation charges in influencing final prices, would apply with even more effect in the majority of other countries.[1] But it is unsafe to make any general statements regarding the transportation costs of different goods. Each commodity must be examined by itself. However, some idea of such costs may be gained from the study made by some Harvard University students, under the direction of Prof. Carver.[2] The table compiled by them has been adapted to the point under discussion: the part played by transportation in influencing final prices (see next page). The only conclusion which can be safely drawn from such scanty data is that there is a wide variation in the part played by transportation in determining the market prices of goods. Even when the goods are of a less perishable character, as in the case of apples and potatoes, the difference between the costs of the long and short hauls is very evident. The percentage of the price paid by the consumers of Georgia strawberries, due to transportation, is doubtless caused both by the perishable character of the goods and the distance between Georgia and Boston which intensifies the danger of deterioration.

[1] The Interstate Commerce Commission's figures for the comparative rates of different countries are quoted by Prof. T. N. Carver in his *Readings in Rural Economics* (New York, 1916), p. 715. The average rates per ton mile therein quoted are as follows: Great Britain (in cents) 3.2, France, 2.2, Germany, 1.64, and U. S. .866. The ton-mile rate for all of India, including the narrow gauge, for 1915-16 was only .75. *Vide Indian Year Book, op. cit.*, p. 242.

[2] Selections have been made from the list of perishable goods. In other cases the figures could not be used because of inability to distinguish between commissions of the middlemen and railway charges. In estimating the percentage of the total cost to the consumer due to conveyance charges in the case of milk, the cost of delivery to the doors of the consumers was included. For the complete list, *Vide* Carver, *op. cit.*, p. 330, *et seq.*

Product	Where produced	Where consumed	Price received by producer	Price paid by consumer	The difference	Percentage of Consumer's Price due to Transportation
Apples	Marlboro, Mass.	Boston	$2.25 (bbl.)	$7.50	$5.25	4.6%
Apples	Wenatchee Valley, Wash.	Chicago.	$1.45 (bbl.)	$8.00	$6.55	7.6%
Milk	Montgomery Co., Pa	Phila.	.03⅝ (qt.)	.08	.04⅜	31.3%[1]
Milk	Worcester, Mass.	Boston	.02¾ (qt.)	.08	.05¼	31.3%
Potatoes.	Aroostook Co, Me.	Cambridge, Mass.	.50 (bu.)	.90	.40	17.2%
Potatoes.	Mass.	Cambridge, Mass.	.55 (bu.)	.90	.35	5.5%
Dressed turkeys.	Northern New York.	Boston	.25 (lb.)	.38	.13	2.6%
Strawberries.	Georgia	Boston	.08–.14 (box)	.15–.25	.07–.11	44.4%
Dressed poultry.	Eastern Mass.	Boston	.19½ (lb.)	.33 (lb.)	.13¾	14.4%[2]

If in America, transportation charges form such an important part of the difference between what the producer receives and what the consumer pays for perishable goods, the need of reducing the costs of transport in the Orient is very much greater, for three reasons: in the first place, the eastern countries have not the close reticulation of efficient means of transportation, such as England and America possess; again, the bulk of the product of oriental countries is agricultural, and much of this product is perishable goods; also, the heat of the climate causes the danger of deterioration of perishable goods to be much greater than in western countries.

[1] Two cents per quart are charged for delivery.

[2] "shipping and selling commissions" are put together at .04¾. Of the balance .09, the wholesaler received .04 and the retailer .05.

We have seen in this study of the elasticity of the demand for transportation how the amounts demanded of a commodity vary with prices and so react upon the demand for transportation. Whatever lowers the cost of production and decreases the price will tend to stimulate the demand for transportation according to the degree of elasticity of the demand for the commodity. But more specifically, the lowering of the cost of transportation of such a commodity will, by decreasing the cost of production, tend to stimulate the demand for transport in proportion to the part played by transportation in the production of the commodity. The importance of the service rendered by the means of conveyance varies with bulk, distance, and time elements.

But the quantity of goods which is affected by the decrease in the cost of conveying them may not be sufficiently great to justify the building of new and better means of transport. To use figurative language, so far we have discussed the effect of raising or lowering the flood-gate of price upon the rapidity of the flow of goods above the gate; we have not discussed the size of the stream. Under what conditions will the demand for transportation be large enough (as well as elastic enough) to justify the investment of large sums of money in modern facilities for transportation? This is the next problem to be discussed.

THE QUANTITY DEMAND FOR TRANSPORTATION

By assuming a locality so small that the demand for transportation within itself can be accounted unimportant, we can then say, the quantity demand for freight transportation of any locality is dependent upon the total demand of the locality for the production of all other localities, together with the total demand of all other localities for the production of the one. If the bounds of the locality be

extended, assuming the non-existence of any trade barriers, a part of that which was external becomes internal transportaton, but the total demand for transportation remains unchanged.

According to the teaching of the Classical School of Economics, the value of the goods which are produced within the locality and shipped abroad is equal to the value of the goods which are brought into the locality.[1] But there is no such equality in the demand for transportation, as the elements of bulk, distance and time make it impossible.

The total demand of any community for the production of the others from which it receives goods, and hence for their transportation, will vary with some broad general characteristics.

Firstly, it varies with the number and the density of the population. The larger the population and the more compact it may be, the more will distance become a factor in supplying the wants of the people.[2] This is due in part to the fact that the pressure of population upon the natural resources is soon felt, especially for food supplies, and people are driven further afield to find adequate sustenance.[3]

Secondly, the intensity and variety of human wants is a very important factor in determining the quantity of the demand for transportation. The demand for goods outside the locality may be either for the purpose of consumption or of production. The simplicity of the wants of oriental peoples has frequently been offered as the chief reason for the backwardness of their industrial life. In this instance, the idea of consumption is in mind. It is believed that the

[1] Mill, J. S., *Principles of Political Economy* (New York, 1906), vol. ii, p. 149.

[2] Roscher, Wilhelm, *op. cit.*, pp. 356, 357.

[3] *Cf.* Cooley, C. H., Publications of Amer. Economic Association, vol. ix, *The Theory of Transportation*, p. 73.

per capita production is small because the level of wants is low. It is also true that the standard of wants is low, because of a small per capita production. Of the two, the second is the more important. The best possible way to increase the wants of men is to give them a surplus. Transportation plays an important part in increasing the surplus of the consumer by giving him access to special markets for buying certain goods [1] as well as by allowing him to sell his goods in a wider market.

The effect of education upon human wants is twofold: it increases the variety of human wants and so stimulates production; it also increases the efficiency of production and so makes possible the satisfaction of the increased number of wants. The quantity of the demand for transportation is likely to be affected in both cases, for the greater the variety of human wants, the further afield will men be compelled to go to satisfy them; and the greater the surplus produced, the greater the quantity demand for transportation, in order to market this surplus to the best advantage.

Thirdly, the quantity demand for transportation varies with the extent to which the locality has learned to practise division of labor in production. If territorial division of labor is in force, so that the locality gives itself to the production of the goods for which it is best equipped because of the possession of raw materials, motive power,

[1] "Die 'verkehrschaffende' Wirkung aller zweckmässigen Transportverbesserungen beruhet darauf, dass sie durch bessern Rapport zwischen Bedürfniss und Befriedigungsmittel sowohl den Gebrauchswerth, als den Tauschwerth des Volksvermögens erhöhen. Wenn z. B. abgelegene Wälder, Steinbrüche u. s. w., die bis dahin gar keinen präsenten Werth hatten, durch Anlage eines Kanals, einer Eisenbahn, in ihrer Nahe sofort sehr werthvoll werden, so braucht darum nichts anderes an Werth zu verlieren, sofern eben neue, bisher schlummernde Bedürfnisse erst durch diese Befriedigungsmöglichkeit geweckt worden sind." Roscher, W., *op. cit.*, vol. iii, pp. 373-74.

efficient supply of labor, and markets close at hand, the demand for transportation is greatly increased. In fact, territorial division of labor without the means of transport cannot come into existence. Because a locality gives itself to the production of those commodities which it can best produce, it is dependent upon other localities for the other goods which it requires, whether they be for the purpose of consumption or of production. This is the source of the first increase of demand for transportation, which is due to territorial division of labor: the greater the localization of industry, the greater the demand for transportation to convey other commodities which the consumers in the community of the localized industry demand. The second cause of an increased demand for transportation is that the goods whose production is so localized will have to be shipped a greater distance than when their production was scattered over the country.

Territorial division of labor has increased production; and the size of the national dividend has been still further enlarged by the application of industrial and technical division of labor, machine production and trained management; so the per capita surplus is greater than before modern methods of production were introduced. A portion of this surplus will be spent for commodities, either for the purpose of consumption or of production, which will increase the demand for the means of transport. This is the third cause for the increase in the demand for transportation, due to modern division of labor.

Fourthly, an added demand for transportation is caused by the fact that in the modern system of production it is highly desirable that both labor and capital should flow to the point of greatest need. By need is meant that requirement of the progress of civilization that those resources be developed which give the highest rate of return, either

directly or indirectly. Sometimes, as in the case of some of the coal-fields of England, the need was so great that it was able to develop its own adequate transportation facilities. In other cases, as in the western part of the United States, the development of the natural resources followed the introduction of the means of transport. But in each case, the means of transport was a necessity in order to allow the more advantageous uses of the factors of production. Aside from the fact mentioned above,[1] that the means of transport are required to furnish an outlet for the produce, it is a well-known fact that labor and capital do not flow freely to inaccessible places. Just as transportation increases the velocity of circulation of money,[2] so is it also a necessity to enable the forces of production to seek the locality of greatest advantage. The result is a greater demand upon the means of transport within a locality because of the increase of production of the new source over the old, and the increased demand in response to the fall in price.

Therefore, the country or locality which possesses these four characteristics—a population of considerable density, wants developed above the mere physical necessities, a modern system of production under division of labor and machine production, and a free flow of capital and labor to the points of greatest advantage—will have a large quantity demand for transportation. A locality lacking these characteristics will not have such a demand. Excluding

[1] "The flow of investment of resources for future needs consists of two streams. The smaller consists of new additions to the accumulated stock, the larger merely replaces that which is destroyed." Marshall, Alfred, *Principles of Economics*, 4th ed., pp. 604-5.

[2] Fisher, Irving, *Elementary Principles of Economics* (New York, 1919), pp. 201, 202.

mere density of population as distinguished from the concentration of population in cities, each one of these characteristics requires for its development the presence of adequate transportation facilities. It is as logical to say, with reference to backward countries, that such modern forms of production and consumption are non-existent because of the lack of the facilities of transport, as to say that the means of transportation are not improved because of the lack of higher wants and modern methods of production.

THE DEMAND FOR THE TRANSPORTATION OF PASSENGERS

In the classification of transportation with reference to the objects carried, the distinction was made between goods and passenger transportation.[1] There are certain ways in which these two demands differ from each other. The transportation of goods from one place to another is one step in the production of commodities, and so bears a close relationship to manufacturing. Passenger travel is frequently a complete end in itself.[2] Another difference appears in that the passenger is concerned only with what the company charges him, and is not distressed over what others are charged. This is not the case in goods transportation, for while the shipper does not bear the cost of the conveyance of the goods, yet there is a possibility of his being undersold by some competitor, who enjoys a better freight rate than himself.[3] Because of this indifference, there is no wide-awake body of specialists, which con-

[1] *Cf. supra*, p. 24.

[2] Marshall, Alfred, *Industry and Trade, op. cit.*, p. 462.

[3] *Vide* Woolley, Robt. W., *How Freight Rates Should be Made*, in The Annals of the American Academy (November, 1919), p. 162. Mr. Woolley here says, "It is not exaggeration to say that more than 90 per cent of the complaints brought by shippers before the rate regulating bodies, rest upon dissatisfaction with the relation between rates rather than upon the measure of the rates."

cerns itself about passenger rates as is the case in freight rates.

In many respects, passenger traffic is much more exacting than freight traffic.[1] Speed, regularity, safety, comfort and convenience are all demanded by the passengers in varying degrees. Furthermore, in order to catch and hold certain kinds of passenger traffic, cheapness is also necessary; for example, in the case of the season tickets in England or the monthly and family tickets in the United States the company "commutes" a certain portion of the regular charge.

There is one further distinction between passenger and goods traffic, which seems to be based on social distinctions. In the passenger service, railways sell special tickets to certain people at a reduced price. In England, cheap tickets are issued to workmen, and season tickets to school children, students and apprentices under eighteen years of age.[2] In America, by the use of certificates, clergymen are able to purchase railway tickets at half fare. There is nothing found in goods traffic rules which would correspond to this social basis of discrimination.

THE ELASTICITY OF DEMAND FOR PASSENGER TRANSPORTATION

It is evident that the elasticity of demand for passenger transportation is, in many cases, independent of any commodity or its production. It reacts directly to the fluctuation in fares. For this reason, it is necessary to divide those who travel into two classes: those who travel for a money profit [3] and those who travel for some other purpose.[4]

[1] Johnson and Van Metre, *The Principles of Railway Transportation* (New York, 1916), p. 182.

[2] Knoop, Douglas, *Outlines of Railway Economics*, p. 225.

[3] *Cf. supra*, p. 24.

[4] *Cf.* Knoop, *op. cit.*, p. 20.

Those who have an economic motive in traveling may be divided into three general groups, each of which reveals a certain degree of elasticity in its demand. The first of these is the commercial class, which travels to produce or sell goods. The elasticity of the demand of this class for passenger service will depend upon the percentage which passenger fares form of the total cost of producing the goods. If the fares are only a small portion of the total expense, there will be little diminution of travel if the fares are raised, or little increase if they are lowered; that is, the demand for transportation will be inelastic. But if transportation fares form a large proportion of the costs of goods, and the demand for the goods is elastic, then an increase in the fares will cause a decrease in the demand for transportation. This would apply to those who sell goods or collect debts on a commission basis, and in so doing are responsible for their own expense account. In such cases, however, the percentage of costs due to fares diminishes, as the amount of business transacted increases.

If members of the commercial group are fortunate enough to be selling a commodity which is a necessity, then an increase in the costs of travel will not reduce the demand for transportation, for the increase of cost will be shifted to the consumer of the good in the form of a higher price.

The demand for transportation of this class is given a greater degree of elasticity than it would otherwise possess, because of the many business evasions of travel, or substitutes for it. For example, a firm in order to avoid the expense of sending out traveling salesmen, may use the mails to send their customers catalogues with drawings and descriptions of the goods to be sold. The sending of samples and models is also common. Then the telephones and telegraphs are at the firm's disposal. Advertising in the

papers and through the mails tends to make the demand for transportation for passengers of this class more elastic.

The second group of those who travel for economic reasons is comprised of those who live some distance from their place of work, and use the means of transportation to go to their work in the mornings and return home in the evenings. Therefore, there is a demand for a regular, cheap and convenient service to make it possible for those who work in the cities to live in the suburbs. The railways, electric lines and motor buses have catered to this demand.

There are reasons why "commuters" prefer the suburbs to the city: cheaper rents, better surroundings or a combination of both. On the other hand, there is the expense of travel, the expenditure of time, and the possible inconvenience in commutation. The transportation companies are competing against the landlords in the cities, and if the fares are too high or the inconvenience too great, this traffic will dwindle. Therefore cheap tickets are sold, and special trains are run for the benefit of this group.[1] The elasticity of demand for this kind of transportation is stronger in the case of the poorer people than with the rich. Because of this fact, in England special workingmen's trains have been established, made up of third-class carriages, which carry the workers at a very low figure.

[1] This form of demand for transportation raises some interesting problems as to the costs to the companies. The advantages to the railway organizers over other forms of traffic are: regularity, both in time and amount, so the company is able to run full trains all the time; the small amount of baggage carried; and the small amount of supervision and work required in the offices. The disadvantages are: a "peak load" each morning and evening, with idle rolling stock the remainder of the day; frequently strong competition from other companies; and short-distance hauls. For a melancholy picture of the situation in London, *cf.* Williams, S. C., *The Economics of Railway Transport* (London, 1909), p. 245, *et seq.*

One other element adds to the elasticity of the demand for this traffic as far as any one company is concerned. Close to a large city, competition usually exists, either between railways or between a railway and an electric line, or a motor-bus line, or water transportation; so that any one company cannot raise its rate without losing traffic to some other; and because decreasing the cost operates strongly, any company hesitates before raising the fares.

Another group of those who in contributing to the demand for passenger transportation have an economic object in so doing, is composed of laborers who pass from one place to another, in order to sell their labor in the highest market. As the natural and artificial forces of production are unevenly distributed over the earth, there are greater relative demands for labor in some localities than in others. Because the supply of labor has never perfectly adapted itself to the varying opportunities of production in different places, the rewards of labor vary with localities. Man is slow to seek his highest advantage by moving from place to place, for many reasons: love of home, ignorance of where his best advantage is to be found, indifference and inertia, and frequently because of his inability to meet the expenses of transporting himself, his family and his goods. Effective means of transport greatly encourage mobility of labor.

The demand for transportation due to geographical mobility of labor, is very real and important, both from the point of view of the general welfare of society [1] and of the

[1] It is beyond the scope of this enquiry to discuss the increased welfare of peoples, which is due to mobility of labor. However, three elements are outstanding in their importance, in this connection. Firstly, mobility of labor brings about a greater adaptability of human powers to production, by increasing the choices of occupation. Secondly, the application of labor to the places of greater natural or artificial resource increases production. Thirdly, the strain of furnishing articles of con-

special welfare of the laborers themselves. Some of this mobility of labor is seasonal, as the response of the East to the call of the West, at the harvest time in the United States. At other times it is spasmodic, as in the rush of men to the places of fresh discoveries of gold or oil. But by far the most important part of this demand for transportation is the steady and unobserved flow of labor to the places of higher wages, or of greater reward for its efforts. Campredon explains the remarkable development of the resources of the western part of the United States by pointing out the part that the railways have played in making it possible for men and materials to reach the resources of the West.[1]

Another aspect of the need for transportation facilities in order to increase the mobility of labor, is to be observed in times of interruptions of industry; *e. g.*, epidemics, strikes or lockouts, famines and fires. In this connection, Francis A. Walker says:[2]

> Deal the heaviest blow you can with a hammer into a bin of barley, and you will not injure a single grain, though the hammer be buried to your hand, because every grain moves freely from its place, and the mass simply opens to receive the intruding substance, and closes around and above it. Lay one of the grains upon a rock, and your blow will smash it into a paste. . . . In the nature of the case, blows must fall, from time to time, upon every industrial community or class. Whether these be due to wars or failures of the harvest, or to

sumption is reduced in places where nature has been niggardly, or capitalistic production backward, by reducing the number of people dependent upon these resources. A large labor supply is of advantage only when the development of natural resources has kept pace with the growth of population.

[1] Compredon, Eugène, *Rôle Économique et Social des Voies de Communication* (Paris, 1899), pp. 53-66.

[2] *Vide* Walker, F., *Political Economy*, p. 264.

conflagrations and floods, or to the shifting of commercial demand, or to vicious legislation, labor has an ample security against deep and permanent injury, so long as its mobility is unimpaired. On whatever spot the blow may fall, complete freedom of movement, from place to place and from avocation to avocation, will cause the original loss to be distributed over the industrial body, while the forces of repair and restoration will immediately set to work to make good what has been taken away.

The demand of laborers for means of conveyance to new fields of labor has some degree of elasticity, especially in countries where distances are great. One important factor in increasing this elasticity is the lack of savings for such an emergency on the part of the laborers themselves. Frequently they do not seek a new field of labor until their savings have been spent. In countries and localities where the people are poor, the difference between cheap and more expensive transportation may be sufficient to make labor much less mobile than it otherwise would be. It is not so much a question of lower or higher rates on the railways,[1] as it is the difference between the old form of conveyance and the modern means of transportation.

On the other hand, the feeling of expectancy of a much greater income in the new locality than was received in the old, will tend to increase the inelasticity of this demand. The immigrant who comes to the United States would not be kept back if the costs of transportation were doubled; he might be delayed until the larger sum was accumulated, but he would come sooner or later.

Besides those who travel for purposes of business, or

[1] In England and in most of the countries of Europe, the fares are levied according to classes. The lowest class fare is low enough to permit any but the indigent to travel. *Vide* Knoop, Douglas, *op. cit.*, p. 225, *et seq.*

from some economic motive, there are many who travel for non-economic reasons. There are some non-economic motives for travel which are social in character, which furnish evidence of a high degree of inelasticity of demand; *e. g.*, travel to attend the funeral or wedding of a friend or relative, or in the performance of some religious or patriotic duty. In such cases the sense of social or religious duty is stronger than economic considerations.

But the larger part of those who travel for non-economic motives do so for pleasure. The demand for transportation, when it is caused by the search for pleasure and rest, is highly elastic. This is due to competition in a two-fold form. First, there is competition between different companies which are bidding against each other, each company seeking to induce as many people to use its facilities as possible. The cause of the strength of this kind of competition for the traffic of those seeking pleasure or vacation resorts is due to the fact that the prospective travelers have a wide range of choice as to destination. In business travel, this is not so. The pleasure-seekers may travel in any direction, by land or water, to that destination which will offer the greatest opportunity of rest and enjoyment, at the least expense.[1] This competition between companies is further complicated by the fact that when people travel for pleasure, they take more thought of comfort and convenience than when traveling for business reasons. Railway and steamship companies advertise reduced fares[2] and unusual comforts and luxuries in order to draw patronage away from their competitors.

[1] *Vide* Elliott, Howard, "An Address to the Annual Convention of the American Association of General Passenger and Ticket Agents," delivered at Copley Plaza Hotel, Boston, Mass., September 16th, 1914.

[2] *Cf.* Weyl, Walter E., *The Passenger Traffic of Railways* (University of Pennsylvania Series of Political Economy and Public Law, No. 16), (Philadelphia, 1901), p. 63.

The second form of competition with which the transportation companies are faced in securing the traffic of those bent on pleasure, is that of increased comforts and pleasures at home in lieu of the enjoyment of a vacation spent away from home. The individual may conclude to build a sleeping porch to his house, or a pagoda in his garden instead of visiting a mountain or seaside resort. In London and New York, the theatres which are kept open during the summer months compete with the railways and steamship lines for this patronage. Because of these two forms of competition, and because pleasure travel is a luxury and must also compete against future wants which are uncertain to the consumer, the demand for this kind of transportation is the most elastic of all.

The expenditure of a commodity for pleasure arises from its surplus spending power. In general, the quantity of the demand for pleasure-travel increases as the surplus of incomes over living expenses increases.[1] But localities vary, as do individuals, in the use made of this surplus. Custom, social distinction, tendencies to thrift, and many other things affect the quantity demand for this form of transportation. Yet there can be little doubt that the claim of careful students that a reduction of fares would greatly increase the amount of passenger traffic, not only for distinctly pleasurable purposes but for all purposes, has reasonable justification. Both Prof. Johnson and Dr. Weyl are persuaded that the increase of passenger traffic in the United States, due to the decrease in the fares, would increase the net revenue of the railways.[2]

[1] *Cf.* Williams, S. C., *op. cit.*, p. 247, *et seq.*

[2] *Vide* Johnson and Van Metre, *op. cit.*, pp. 198, 199; also Weyl, Walter E., *op. cit.*, p. 21.

CHAPTER II

A Historical Sketch of the Means of Transportation in India

Transportation facilities within any country are usually classified under three heads: waterways, roads and railways. Waterways may further be divided into navigable rivers, navigable canals and coastal navigation. Roads have usually been classified according to their construction, having a regard for the materials used in the road-bed, and the covering or paving of the same. To-day it is necessary to consider the service rendered by different kinds of roads in the light of the vehicles which will be used on them. Motor transport is rapidly causing a reconsideration of the relation that formerly existed in the minds of people between roads and railways. Railways may be divided into trunk lines and subsidiary lines or " feeders ". They may also be classified according to the width between the rails, as broad or narrow gauge.

WATERWAYS

In considering the subject of waterways in India, the first class to be noticed is that of navigable canals. These are of two kinds: those which are for navigation only, and those which are also used for irrigation. It is obvious that the chief advantage in having canals which serve both the purposes of irrigation and of navigation is that of reduced cost. On the other hand, there are difficulties in constructing the canals that they may successfully serve both purposes. Irrigation canals should be as high as pos-

sible above the plains to be irrigated, and the current should be strong, so as to quickly replace the water drawn from the canal for irrigation. Navigation canals, on the other hand, should be on low ground with a current so slow that boats may go in either direction without difficulty.[1] Again, irrigation canals are independent of large cities and trade centers while canals used for transportation only are dependent upon them.[2] It is also true that when the rains fail, the water in the canals is likely to be so low that boats are not able to navigate them.[3] For these reasons, while India has a remarkable supply of irrigation canals, very few of them are used for navigation.

In Madras Presidency there are two important systems of irrigation canals which are almost entirely navigable. They are the Godaveri and Kistna systems. The former has a total length of 506 miles, 493 miles of which are navigable. The Kistna system has a total length of 372 miles, all but 40 miles of which can be used for transportation purposes. The total number of boats which use the two canals is about 80,000 per annum. The average annual receipts are $46,100.[4] While this sum is about equal to the working expense of the navigation, yet the Government has been able to make the land assessment of the irrigated tracts higher than it could have been made had the people been without this cheap means of transportation. Mr. MacGeorge estimates for the year 1890-91 the net revenue earned on the capital outlay in the Godaveri delta as 12½%.[5] There is one other irrigation canal in Madras

[1] *Vide* MacGeorge, G. W., *Ways and Works in India* (London, 1894), p. 131.

[2] *Imperial Gazetteer of India* (London, 1907), vol. iii, pp. 354-5.

[3] *Cf. Indian Year Book, op. cit.*, p. 252.

[4] Rate of exchange is here taken at 32.5 cents.

[5] MacGeorge, *ibid.*, p. 191.

Presidency which is used for navigation — the Kurnul-Cuddapah. It is 190 miles in length and has two railway connections. No dues are charged, but the canal is little used as a means of transportation.

In Bengal there are three large systems of irrigation canals which are used for navigation: the Orissa Canal system, 280 miles in length; the Midnapore Canal, 72 miles long; and the Son system of 218 miles. The canals are used only to a limited extent and the receipts do not cover the operating costs due to navigation. One cause of the moderate use made of these canals is the competition of railways which were constructed after the canals.

Since the Agra Canal was closed to navigation in 1904, the United Provinces of Agra and Oudh has only two navigable canal systems; namely, the Upper and the Lower Ganges canals, with a total extent of 275 miles. In spite of the fact that there is connection with the Ganges River at Cawnpore, there is little through traffic to Calcutta. There is, however, considerable local traffic. The traffic receipts amount to less than $5,000 per annum, which amount covers about one-half of the working expenses of navigation.

In the Punjab, the navigable canals are the Western Jumna and the Sirhind. The total length of the navigable canals of the former system is 207 miles, while that of the latter is 180 miles. The traffic on each system is insignificant.

Aside from the canals which have already been mentioned, there are a few others which are used entirely for the purpose of navigation. Chief among these is the Buckingham Canal, which has a length of 262 miles and lies in the Madras Presidency. The expense of maintenance is very great and the traffic is moderate. In the same class is another system of canals in Bengal, which is known as

the Calcutta and Eastern Canals. These canals connect the river courses of the deltas of the Ganges and the Brahmaputra, and counting both the river channels and the canals, the total length of the system is 735 miles. There is a large traffic and the income is considerable. This system may be considered the most successful of the navigable canals of India, whether regarded from the point of view of tonnage or receipts.

In Burma, the Government maintains two canals for navigation: the Pegu-Sittang and the Sittang-Kyaikto. The receipts from the former are about $47,000 per annum.

The general conclusion regarding navigable canals, whether in combination or for navigation only, must be that with a few exceptions, the people have not been eager to use them as a means of transportation. No one of the systems has been able to show a profit. During the years in which the railways of India were operated with a recurring deficit, there was much discussion as to the advisability of extending the construction of canals as a means of transportation. It is now known that canals are not to be the solution of the country's transportation problem.[1]

Apart from the combination of rivers with canals, rivers in India have formed, since early times, waterways for transportation. Near the mouths of some of the great rivers the traffic is still heavy. But the actual service rendered by the great rivers, as ways for transportation, is not as great as one would expect, considering the length of the streams and the volume of water which passes through them. The reason is to be found, in part at least, in the peculiar physical characteristics of the river valleys and the concentration of the country's rainfall. The streams usually occupy wide valleys and have low marginal

[1] *Cf. Indian Year Book, op. cit.*, p. 252.

banks of alluvial soil. Before the coming of the monsoon rains, the streams in many cases dwindle to mere threads. After the rains are well under way the rivers become torrents and frequently overflow the low banks and spread out over the river valleys. When the rains have ceased and the streams have settled back into definite channels, they are found to be considerably changed in current, depth, and even direction. Much silt is washed down from the mountains, which affects the navigable character of the streams, especially at the lower reaches. As regularity, speed and reasonable safety are characteristics of an effective system of transportation, river transportation in India leaves much to be desired.

The leading rivers of the country, which are navigable for long distances throughout the year, are the Ganges, the Brahmaputra, and the Indus. The Ganges can be considered navigable as far as Cawnpore, at least for small boats, but the river traffic from Calcutta to that industrial city is not great. The Brahmaputra is navigable as far as Dibrugarh. The Indus is "constantly navigable as high as Dera Ismail Khan, . . . 800 miles inland." [1] The Godavari, the Kistna and the Mahanadi rivers permit navigation a considerable distance above their deltas, but they are little used for transportation. In Burma, the greatest use is made of rivers for navigation. The Irrawaddi can be used as a waterway for boats of some size for a distance of 500 miles.

Considering India as a whole, it may be said that the proof that river-ways do not adequately meet the need for transportation of even those people who live close to the banks of navigable streams, is to be found in the effects of river and railway competition. Before the East Indian

[1] *Gazetteer, op. cit.*, p. 361.

Railway was built from Calcutta to Delhi, certain towns and cities along the banks of the Ganges river had attained some degree of importance as river ports, but they have now lost much of their former prosperity.[1] Probably the chief service rendered by the river waterways is to be found in the irregular local shipping, by small country boats, which are propelled by oars or by poles, or are towed by men pulling from the banks. Much of this shipping must go unrecorded, although its total must be great.[2]

The total value of the coasting trade for 1916-17 amounted to £76 million. The pre-war quinquennial average was £73 million. The share of each province for 1916-17 was as follows: Bombay, 35.2 per cent; Burma, 27.5 per cent; Bengal (including Bihar and Orissa), 17.8 per cent; Madras, 10.3 per cent; Sind, 9.2 per cent.[3]

ROADS

By the modern use of the term road is meant a way which is provided with a smooth and hard surface and easy grades, with permanent bridges over the streams, and which possesses adequate drainage. India has a supply of such roads, which are termed "first-class" roads. Besides these, there are the "second-class" roads, and still lower down in the scale the "fair-weather" roads. A second-class road may be one of two sorts. It may be

[1] Mirzapur, in the United Pronvinces, between Benares and Allahabad, is an example of such decline.

[2] *Vide Accounts of the Trade Carried by Rail and River in India*, published annually by the Government of India. In the prefatory note to this report, a statement is made of the manner in which the statistics of river-borne traffic are gathered. With reference to the boat trade, it is explained, "The boat traffic is registered at certain selected river stations by clerks, who collect the required information from the boatmen and forward the returns to the provincial officers."

[3] *Vide Review of the Trade of India*, Parliamentary Papers (London, 1918), p. 33.

properly embanked and surfaced, and of the same width as a first-class road, or possibly narrower, but it lacks permanent bridges. Again, a second-class road may be banked and drained but may lack both a hard surface and bridging. All that can be said in favor of the fair-weather road is that it is scientifically laid out, ditches have been dug at the sides, bushes and trees have been cleared away, and the banks have been graded at the approaches to the streams. These roads are of service for about eight months of the year.[1]

Roads of the first class did not exist in India until about 1840.[2] The native princes did not build roads of this sort. They were content to plant trees along the tracks used as roads, occasionally to fill in depressions, and to build caravansaries (*sarais*) at the halting places. The Moghul kings did build some noble bridges, a few of which are still standing; as the Gumti Bridge at Jaunpur. Some of the rajahs of Assam built high embankments (*bunds*) to avoid the floods, and ran roads along the top. Such was the road that Rajah Rudra Singh built over a century ago, between Jaipur and Jankana, a distance of seventy miles.

Even many years after the establishment of British rule in India little attention was paid to roads. In 1818 an effort was made to improve the tracks that existed by putting convicts to work on them, but little seems to have been accomplished.[3] To Lord William Bentinck (1828-1835) is due the credit of being the first ruler to consider seriously the construction of a first-class highway. This road now connects Calcutta with Delhi and Peshawar, and has become famous in history and story as the "Grand Trunk Road." This monument of enterprise and determination

[1] MacGeorge, G. W., *op. cit.*, p. 66, *et seq.*

[2] *Cf. Gazetteer, op. cit.*, p. 402.

[3] MacGeorge, *op. cit.*, pp. 72-3.

has a complete length of 1500 miles; and for some years it was the greatest road of its kind in existence. Throughout its entire course it is raised above the flood line and is well bridged. Trees have been planted at intervals of 50 or 60 feet. Camping places and "rest-houses" have been provided every ten or fifteen miles. The exact cost of the road is not absolutely certain, as the construction extended over two decades, and as part of the road was built by famine-relief and convict labor. Exclusive of bridges, the cost per mile has been estimated to have been £500.[1] Until the railway was built, which practically parallels it, the Grand Trunk Road had such heavy traffic that the metalling had to be renewed on the average every six years.

Another important trunk line, known as the "Great Deccan Road," was begun in 1856. One terminus was at Mirzapur, where it made a connection with the Grand Trunk Road. From this place it was carried southeast to Nagpur by way of Jubblepore. At the completion of Nagpur's connection with Bombay, India had first-class metalled roads, extending across the peninsula from Calcutta to Bombay.

Another fine road, which was built in the early days, was that which runs from Bombay to Jhansi and Agra. This was begun in 1840, and when complete had a length of 735 miles.

From these early and successful efforts at road-building, progress continued, with the result that in 1870 many of the great trunk lines for trade and military purposes had been completed. Much of the progress achieved during these years was due to a change made in the administration and control of road-building. Up to 1855, the construction of roads was in the hands of Military Boards—

[1] MacGeorge, *op. cit.*, p. 84.

one for each presidency. The actual work of construction was committed to the authorities of the different provinces in which the roads were built. While the power of the Military Boards to supervise was great, their power to administer and exercise financial control was limited. The natural result was a great confusion. When the Punjab was annexed, a department was organized for the construction of all public works within its territory. The result was so satisfactory that the Military Boards were abandoned and a Public Works Department was created in each province. The Central Government created a Public Works Secretariat, to have general control over the Public Works Departments in all the provinces. Such was the birth of the Public Works Department to which India owes so much. From 1855, the construction of new roads was carried on in a more economical and scientific manner.[1]

The progress of roadbuilding has also been furthered by another act of decentralization. The authority and responsibility for "maintenance and improvement of local communication" have been delegated to district and subdistrict boards. Usually the control of the main trunk lines remains in the hands of the provincial governments, and it is only the subsidiary lines which have been committed to the district boards. The general result of this decentralization has been an increase in the number of first and second class roads within the provinces.

There is a paucity of statistical data regarding the extent, costs of construction and maintenance of roads. Concerning this scarcity, the *Imperial Gazetteer* of India attempts an explanation:

The collection of statistics regarding roads in India has never received much attention, for their classification, the circum-

[1] *Gazetteer, op. cit.*, p. 406.

stances under which they are constructed, the demands which they meet, and the funds available for their up-keep vary so greatly in different parts of the country, that there is no common object to be served by their compilation.[1]

The available figures give the length of metalled roads, at the close of 1902, as 37,000 miles, and the total length of the unmetalled roads as 136,000 miles.[2] Both of these figures relate to roads which are maintained in condition, either by the governments of the provinces or by local bodies.

The effect of railway construction upon the demand for trunk roads which parallel the railways has been to decrease the demand for the trunk roads. Long hauls over these roads are no longer profitable where railways are available for the same destination. The service which remains for such trunk roads to perform is to make possible the short hauls between places located on or near the roads, and to facilitate traffic to the railway stations. In general, it may be said that the effect of railways upon the demand for trunk roads has been to decrease the demand for the latter, but to increase the demand for roads as feeders for the railways.[3]

RAILWAYS

In the last division of the means of transport in India—railways—an interesting history is to be found, whether regarded from the political or from the economic point of view. The earliest proposals to build railways in India seem to have been made about 1843. Politically, the time was not propitious for such undertakings, as the country had not yet recovered from the effects of the wars in Sind;

[1] *Vide*, vol. iii, p. 410; *Cf.* MacGeorge, *op. cit.*, p. 104.

[2] *Gazetteer, op. cit.*

[3] *Gazetteer, op. cit.*, p. 407.

and the Government, under Lord Hardinge, was already in difficulties with Ranjit Singh, which were soon to result in war in the Punjab. But England was just entering on the period known as the "railway mania," and in spite of the political outlook, the promoters of the plans for Indian railways were able to get a hearing in England.[1] It seems to have been understood from the beginning that the capital would have to be raised in England, and that the construction and management of the railways would have to be carried out by private companies; and "that the novelties and unknown difficulties of their (railways) introduction into so distant and backward a country would be sufficient to inspire the general public with certain distrust in the speculation."[2]

The Honorable Court of Directors of the East India Company had grave doubts as to the feasibility of railways for India. Companies were being formed and plans drawn, and submitted to the Court of Directors. These plans included a scheme whereby the Indian Government would guarantee a certain rate of interest on the invested capital.[3] In May, 1845, the Court of Directors sent a despatch to the Governor-General of India, in which was expressed some degree of conviction as to the desirability of railways for India. But the Directors also expressed fear that the difficulties were insurmountable. They felt that the income from the railways would have to be drawn chiefly from the transportation of goods and not from passengers. It was also feared that the floods, the violent winds, the destruction wrought by insects and vermin, the ill effects of spontaneous vegetation upon timber, earth and masonry, would make the building and operation of railways in India impossible.

[1] *Vide* Bell, Horace, *Railway Policy in India* (London, 1894), p. 1.

[2] MacGeorge, *op. cit.*, p. 300.

[3] This was a plan which was then in successful operation in France.

To enquire into the whole situation, Mr. Simms, an engineer, was sent out from England, and two military engineers in India were associated with him. In February, 1846, Mr. Simms made his report, in which he dealt with the relations which he thought should exist between the Government and the companies. He felt that it might be advisable to guarantee a small percentage on the capital to be invested in the railways. The military engineers, in their part of the report, said that there were no reasons why railways might not be built and operated in India as successfully as in Europe.

When this report came before the Governor General's Council, Lord Hardinge was not present. The Council took action and decided that the grant of free land to the railways should be approved, but that a guarantee of interest was not advisable, and that the Government should have a large amount of control over the companies and over the work of construction and operation of the railways. Lord Hardinge issued a statement of his own later, which was much more generous to the railway companies. He was inclined to favor a guarantee of interest to the companies.

It was not until 1849, after months of discussion in England and India, that the preliminary legal agreements were signed with the two leading companies: the East India Railway and the Great Indian Peninsula companies. The final contracts soon followed and contained the following stipulations: (1) "The design and execution of certain railroads in India are intrusted to joint-stock companies." (2) "The Indian Government guarantees interest on moneys duly raised by companies and paid over to Government, controlling at the same time their expenditures and operations." [1] The companies, therefore, had an ab-

[1] Quoted by MacGeorge, *op. cit.*, p. 307. The rate of guaranteed interest ultimately became five per cent.

solute guarantee of 5% on all the capital which was authorized to be paid into the treasury of the East India Company. (3) At any time the companies wished to surrender the railroads, on giving six months' notice, they could require of the Government a repayment of the actual capital spent on the roads, plant and rolling stock. (4) The Government promised to furnish to the companies all land required for the railways, free of cost for ninety-nine years. (5) The railways were to carry the mails free of charge, and troops and military stores at a reduced rate. (6) The Government could purchase the roads at intervals of twenty-five years.

Because of the highly favorable terms given to the railway companies, no difficulty was experienced in obtaining sufficient capital to develop the railway enterprise.[1] Two trial lines were undertaken: one from Bombay to Kaliyan,[2] a distance of 33 miles, and another from Calcutta to Pandua, a distance of 37 miles. Both of these lines were open for traffic before 1855. This was the actual beginning of railways in India.

During the time when the experimental lines were being built there was much discussion as to the best method and

[1] The clause in the contract which has been subject to the most criticism is that one which guaranteed interest to the investors. It is generally admitted that the plan had two serious defects: firstly, the rate of interest was higher than necessary; when once it was proved that railways could be built and operated in the country, money could have been obtained at a lower rate. Secondly, the system practically encouraged wasteful expenditure, for the more capital "called up," the greater the return at this high rate. The efforts at justification attempt to show that India did get the railways, at a rapid rate, independent of the hampering influence of a fluctuating budget. *Vide* Connell, A. K., *The Economic Revolution in India* (London, 1883), pt. ii, *passim*; Chesney, Sir George, *Indian Polity* (London, 1894), 3rd ed., p. 302, *et seq.*, also, Bell, Horace, *op. cit.*, p. 59, *et seq.*

[2] This line was open for traffic, as far as Tamah, twenty miles from Bombay, on the 16th of April, 1853.

policy for the construction of railways in the country. After many different plans had been proposed, some of which were wise and some foolish, the Government realized that a definite line of action would have to be taken if India was ever to be blessed with effective means of transport. Lord Dalhousie put out at this time his justy famous minute of 1853. He pointed out the economic and political benefits which would follow the joining of the important cities with trunk lines of railways, and the connecting of each of the interior cities with its most natural port. The trunk lines proposed by him were as follows: one from Calcutta to Lahore, one from Bombay to North India, one from Bombay to Madras, and another from Madras to the Malabar coast. These proposals were accepted by the Court of Directors; and before the close of 1859, the Government had sanctioned the construction of 5,000 miles of railroads, and had guaranteed interest on capital amounting to £52,500,000 sterling.[1]

The gauge originally adopted for Indian railways was a compromise between the 7 feet gauge then in use in England and the 4 feet 8½ inch gauge more commonly used. Mr. Simms advised a compromise gauge of 5 feet and 6 inches.[2] At that time the popularity of the broad gauge was great in England, and it was thought that any gauge less than 5½ feet would not insure safety against cyclones.[3] Lord Dalhousie accepted this conclusion and 5½ feet became the standard gauge for the railways.

The cost of the lines which were built before 1869 was very great. This was due in part to the system under which they were constructed and in part to peculiar difficulties inherent in the nature of the work. The defect in the sys-

[1] *Gazetteer, op. cit.*, p. 366.

[2] *Cf. supra*, p. 64.

[3] *Vide Indian Year Book*, 1918, p. 231; also, Bell, *op. cit.*, p. 119.

tem has already been referred to.[1] The difficulties were due to the lack of skilled labor in India, the need of importing materials and machinery from England, the physical peculiarities of the climate of the country, the tendency of the rivers to flood, and perhaps more important than all, the fact that experience was lacking in the best way to overcome these difficulties. Added to these obstacles, the expense was increased and the work delayed by the Indian Mutiny of 1857. Railways were also hindered in their construction by the depreciation in the gold value of the rupee, concerning which difficulty Sir John Strachey says, "The earnings of all these works are in silver, but the greater part of the interest on the capital expenditure, the annuities paid in respect of guaranteed railways purchased, and nearly the whole of the payments to guaranteed companies, have had to be paid in gold."[2] Because of these unfortunate conditions and circumstances, the open lines which were built before 1870, cost on the average £17,000 per mile.[3]

It had become evident to the Government of India that if India was ever to have adequate means of transportation, a policy involving less expense would have to be adopted. With this in view, Lord Lawrence took up the question of the future of railways, and in a very able minute, dated March 1869, he made proposals which were to bring the country into its second period of railway development; *i. e.* from 1870 to 1880. Lord Lawrence strongly advocated that in the future, new railways be built by the direct agency of the State and with State money. He then went on to say:

[1] *Cf. supra*, p. 65, footnote.

[2] *Vide* Strachey, Sir John, *India, its Administration and Progress*, p. 255; also, Chesney, *op. cit.*, p. 312.

[3] *Indian Year Book, op. cit.*, p. 231; *Gazetteer, op. cit.*, p. 369.

For a poor country, economy is one of the essential conditions to be complied with, and its requirements may be as rigid as any of those imposed by physical conditions. Wholly to reject railways for a country which is not able to support lines of the most costly description is quite unreasonable; and if, on a further examination in detail of the probable cost and returns of any of the lines, which otherwise seem desirable, the expense of the ordinary gauge seems prohibitory, while lines of the narrow gauge would be financially practicable; I should consider it a most mistaken view to reject the narrow gauge line.[1]

The Secretary of State (the Duke of Argyll) agreed to the proposals made by Lord Lawrence, that narrow-gauge railways be built and that they be built by the State, with capital raised by the State, either by borrowing or taken from revenues. The Government of India was well aware of the evils attendant upon a break in the gauges of a railway system, but it considered that the circumstances demanded a narrower and a cheaper gauge. The metre gauge was finally adopted. The responsibility of borrowing capital for the new railways was undertaken by the Secretary of State, who borrowed the money in London, on the security of the Indian revenues. During this period of ten years the Government never paid a higher average annual rate of interest on the capital borrowed than 4%.[2] Private enterprise was not encouraged to construct railways, and the only roads that were constructed were built by the State. The first narrow-gauge railroad, as well as the first State road, was the Rajputana Malwa Railway, the main section of which was begun in 1873 and finished in 1879.

[1] Quoted from Bell, *op. cit.*, p. 22.

[2] For one year only (1879-80) was the average annual rate as high as four per cent. It seems that the Government now began to receive—as the Duke of Argyll phrased it—"The full benefit of the credit which it lends."

The urgency of the need for more railroads, especially for those of a protective character, led later to a change in this policy of State Construction of Railways. During the years from 1874 to 1879, India experienced a series of famines, which were of a very serious character. There was great loss of life by starvation and disease. In Madras, Mysore and Bombay, more than four millions of people are said to have died in the years between 1876 and 1878.[1] Surgeon-General Balfour in speaking of the famine of these years says, "No past famine has been more intense than that of 1876-78, so none may exceed it in the future."[2] When the Famine Commission of 1880 made its report, it was pointed out that the State could not supply the capital rapidly enough to give the country the protection against famines, which the previous years had shown were so urgently needed. It was the opinion of the Commission that 5000 additional miles of railroads should be provided as soon as possible, and that the country could not be said to be out of danger until it possessed a total mileage of 20,000.[3] The actual mileage which existed by 1880 was as follows:[4]

	Broad Gauge	*Metre Gauge*	*Special Gauge*	*Total*
Up to 1870	4210		45	4255
Between 1870 and 1880	2352	1865	22	4239
Totals	6562	1865	67	8494

The third period of the development of railways in India began after a long discussion between the Government of India and a Select Committee of the House of Commons.

[1] Bell, *op. cit.*, p. 29.

[2] Balfour, Edward, *The Cyclopedia of India* (London, 1885), vol. i, pp. 1075-76.

[3] *Vide* Bell, *op. cit.*, p. 29.

[4] Adapted from the *Gazetteer, op. cit.*, p. 370.

when it was finally decided to return to joint-stock company enterprise in some instances, and to maintain state undertakings in other instances. So in this stage, we have the two forms carried on together, the State being sometimes the builder of the road, and a company the operator, or the State both the builder and the operator, or again, the joint-stock company becoming both the builder and the operator. In 1882, the Southern Mahratta Railway company was organized, on the basis that the company supply the capital and operate the railway, but that the ownership be vested in the State. A guarantee of 4 per cent for seven years was given, and afterwards the rate was to be reduced to 3½ per cent. The company was to receive one-fourth of the net profits.

At this time a determined effort was made to induce companies to undertake the construction of roads without a guarantee of interest, and the Bengal and North Western Railway was undertaken on this basis. Three other companies were also so organized, but one became bankrupt and the others now operate under a guarantee.[1]

By 1880, 8494 miles of railway had been built in the Native States, of which mileage 6562 were broad gauge, 1865 were metre gauge and 67 were special gauges.[2] The policy followed in the building of railways in Native States has varied. In some instances, capital has been taken from the revenues of the States in which the railways were built; and in other instances, the Government of India has loaned money to the States. In yet other cases, the Government of India has been responsible for the guarantee of interest to a company which has supplied capital to the States. In Mysore State, there has been a combination of two methods: a part of the funds has been provided by

[1] *Vide Indian Year Book, op. cit.*, p. 229.

[2] *Ibid.*, p. 229.

the State and part has been loaned by the Southern Mahratta Railway Company, on the guarantee of the Government of India.[1]

Another feature of the development of the railway system of India is to be found in the assisted companies, which first came into existence with the Southern Mahratta Railway in 1882. By the terms of the contract, the assisted companies had two distinct works to do. They raised the necessary capital to build the roads, and passed these funds over to the Government. The State paid four per cent interest on the amount raised. The company also became responsible for the operation of the road after its construction. In the case of the Southern Mahratta Railway, the Government allowed the company one-fourth of the net profits. On much the same plan, the Bengal Nagpur Railway in 1883, and the Indian Midland Railway in 1887, were undertaken. The Government is the owner of the railways, and guarantees to the companies a certain rate of interest on the capital, while the latter are encouraged to economical operation of the roads by grants of a specified percentage of the net profits. The company does not take the risk of the enterprise, so for this reason the term "assisted company" is not a happy one.[2]

Closely allied to this form of assistance was the contract entered into in the construction of the line of metre gauge, connecting Assam and Chittagong. In this instance, the company raised a part of the capital, and the Secretary of State the balance. The Government of India guaranteed interest at the rate of three and one-half per cent for five years, and afterwards at three per cent. The contract provided that the surplus be divided between the State and the company, in proportion as each had contributed towards the total capital.

[1] *Gazetteer, op. cit.*, p. 372.

[2] *Vide* Bell, *op. cit.*, p. 86.

Owing to the changes in policy, the building of railways went forward with greater rapidity. In the quinquennial period from 1883 to 1887 inclusive, the total mileage of all gauges which was opened to traffic, reached its maximum—4231½; which was greater by 33 per cent than had been opened in any previous quinquennial period.[1] This great increase was due in part to the improvement in the financial condition of the country. It was at this time that the Government's limit for borrowing for railways was raised from two to three crores.[2]

In 1893, the rebate system was introduced as a subsidiary policy. The adverse exchange rate so increased the Government's liabilities in gold that the building of railways, either by State agency or by the system of guaranteed interest was greatly hampered. The rebate system avoided the necessity of a gold subsidy; for companies conducting branch lines were offered a "rebate" on the gross earnings on all traffic interchanged with the main line, so that the total profits of the branch-line company should yield a dividend of 4 per cent. The rebate was, however, limited to 10 per cent of the gross earnings from such traffic."[3] Three companies only were organized under this system, for the terms were not sufficiently attractive to call out capital. In 1896 an absolute guarantee of 3 per cent was offered to companies, together "with a share of surplus profits, or a rebate up to the full extent of the main line's net earnings in supplement of their own net earnings, the total being limited to 3½ per cent on the

[1] MacGeorge, *op. cit.*, p. 415.

[2] The term *crore* is used in books on Indian finance to mean that Indian money is the unit; *i. e.*, the rupee. A crore is equal to 10,000,000 rupees. When the term *lakh* is used, Indian money is also referred to. A lakh is equal to 100,000 rupees.

[3] *Vide Gazetteer, op. cit.*, p. 371. *Cf. Indian Year Book, op. cit.*, p. 229.

capital outlay." [1] The result has been that a number of subsidiary lines have been built under one or the other of these options, but neither the subsidy as offered in 1893 nor that of 1896 has been highly successful in calling out a large supply of capital for investment in railways.

An effort has been made by the Government of India to encourage Provincial Boards to undertake the raising of funds for the purpose of railway construction within their own territories. The hope has been that in this way the main lines might be provided with sufficient feeders to meet the need for transportation facilities. The attempt has not been crowned with a great degree of success.

As has been mentioned,[2] the Government of India, when entering into its agreement with the guaranteed companies, retained the right to purchase the railways at intervals of twenty-five years. The Great Indian Peninsula Railway might have been purchased in 1874. But in 1869 the Secretary of State for India began negotiations with the company, in the course of which the promise was made to forego the purchase of the line for another period of twenty-five years, providing the company would consent to the making of a new contract, which should contain, among other things, the stipulation that all surplus profits above five per cent should be divided equally between the Government and the company. The company gladly accepted this offer.[3] Later the same form of contracts was granted

[1] *Gazetteer, op. cit.*, p. 371.

[2] *Cf. supra*, p. 65.

[3] It is difficult to understand why the Secretary of State thought it wise to enter into this new contract, rather than purchase the line. It is generally accepted that the Government of India was the loser. That it was a mistake in policy was the firm conviction of the Indian Government at the time, and it sent in a vigorous protest to the Secretary for India, but before the protest reached its destination, the new contract had been consummated. *Vide* Bell, *op. cit.*, p 25, *et seq.*

to the Madras Railway and the Bombay, Baroda Railway companies.

The first railway to be purchased by the State was the East Indian Railway, in 1879. The method used in making the payment for the railway was by the granting of annuities. The price of the stock was taken at the average for the previous three years, which was £125, on which valuation the annuity was calculated to be £5–12–6. The line was made over to a new company for operation. According to the plan, the Government will redeem the whole cost of the line in seventy-three years. The operating company receives one-fifth of the net profits. Between the years 1880 and 1891 the company received an average sum of Rx 168,540,[1] as its share of the net profits. The railway has been a source of revenue to the State, and the advantages resulting from its purchase are generally unquestioned.[2] The following facts have been published regarding this railway, covering its history through the fiscal year 1915-1916: "The open mileage is 2,719.05; under construction or sanction, 94.18; total 2,813.23. Total capital outlay (on 2448 miles), 7,150 lakhs; gross earnings, 1051 lakhs; net earnings, 639 lakhs; percentage of net earnings on capital outlay, 8.95; gain to the State, 239 lakhs." [3]

Other leading roads which were originally owned by guaranteed companies, but have been purchased by the State, can only be mentioned. The Eastern Bengal Railway was bought in 1884, at which time it was amalgamated with the Northern Bengal State Railway. The Sind-Punjab-Delhi Railway was acquired in 1886, and was amalgamated with the Indus Valley State Railway and the Punjab Northern State Railway, under the name of the

[1] *Ibid.*, p. 79.

[2] *Vide* Strachey, *op. cit.*, pp. 252-3.

[3] *Indian Year Book, op. cit.*, p. 238.

North-Western State Railway. The Oudh and Rohilkhand Railway was purchased by the State in 1889, and has been operated by the State. The Great Indian Peninsula Railway was finally acquired by the Government in 1900, and was made over to a company for operation. The Madras Railway was acquired in 1907 and was amalgamated with the Southern Mahratta Railway.

Before the Great War, the last statement of policy for railway construction was issued by the Railway Board of the Government of India from Simla, on the 14th of November 1913.[1] The heading of the order has significance, as indicating the special need of the time, and the policy considered most advisable (by the Government) in meeting the need. It was as follows: "Terms on which the Government of India is prepared to consider offers for the construction by the agency of private companies of branch lines forming feeders either to State lines worked by the State or to railways worked by companies." The terms offer financial assistance to companies either in the form of a guarantee of interest or of a rebate to the branch line from the net earnings of the main line from traffic interchanged with the branch line. The rate of guaranteed interest is 3½ per cent per annum on the paid-up share capital, and is subject to the condition that "all surplus profits which may be earned by the company, after paying interest on the paid-up share capital at the rate of 5 per cent shall be equally divided between the Government and the company."[2] This guarantee was offered where the State was working the main line. The rebate was of similar character to that offered in 1893,[3] with the exception

[1] *Vide Accounts and Papers*, Parliamentary Papers, 1914-16, vol. xlviii, Appendix 30, p. 534, *et seq.*

[2] *Accounts and Papers, op. cit.*, 3 (vii) (a) p. 535.

[3] *Cf. supra*, p. 72.

that the combined net earnings of the branch line could make up an amount equal to 5 per cent on the paid-up share capital, instead of 4 per cent, as formerly.

Some conception of the effects of the frequent changes in policy which have been summarized in this chapter can be obtained from a study of the following list, which shows the different agencies which have been or are being employed in the construction and operation of the Indian railways:[1]

1. Lines built and operated by guaranteed companies
2. State lines operated by the State
3. State lines leased to companies for operation
4. Lines built and operated by assisted companies
5. Lines owned and operated by Native States
6. Lines owned by Native States and operated by companies
7. Lines owned by Native States and operated by the Government of India
8. Foreign lines.[2]

For a number of reasons, the railways of India have not paid a profit from the very beginning. Some of these reasons have already been mentioned in discussing the reasons for changes in policy in railway construction. The most outstanding reasons for the early deficits might be summarized as follows: — (1) the great expense incurred in the construction of the early lines;[3] (2) the depreciation in the gold value of the rupee;[4] (3) the protective lines were built in some cases for military purposes, and

[1] *Vide* Bell, *op. cit.*, pp. 242-3.

[2] The foreign lines have a total mileage of 74 and are three in number; the most important of which is the West of India Portuguese line.

[3] *Cf. supra*, pp. 66, 67.

[4] *Cf. supra*, p. 67.

in others for protection against famine; some of these were not expected to become self-supporting; (4) the undeveloped state of the country and the consequent lack of immediate use of the lines, either for passenger or for goods traffic. It is not unusual for backward countries to learn very gradually the advantages to be obtained from the use of railways.

Therefore, it was not until the year 1900 that the railways began to show a profit to the State. The following years brought a great increase in the annual net receipts which came to the State, which averaged in the four years between 1904-5 and 1907-8 about £2,000,000.[1] Owing to bad harvests in the year 1908-9, there was a big deficit, but since that time there has been a rapid increase in the net receipts accruing to the State. The fiscal year ending March 31st, 1913, showed a gain to the State from its connection with the railways of £5,490,000.

The percentage of the net earnings to capital outlay on all the railways of India has shown considerable fluctuation between 1904 and 1914. The following table tells the story:

THE PERCENTAGE OF NET EARNINGS TO CAPITAL OUTLAY—[2]
ALL RAILWAYS IN INDIA

1904	1905	1906	1907	1908	1909	1910	1911	1912	1913-14
6.00	6.07	5 96	5.86	4.33	4.81	5.46	5.87	6.77	6.19

The general progress which has been made in railway building in India prior to the War, the extent to which the

[1] *Vide Indian Year Book, op. cit.*, p. 230.

[2] *Accounts and Papers*, Parliamentary Papers, 1913-14, vol. xlviii. "Administration Report of the Railways in India," vol. i, p. 4.

lines are rendering service to the people of India, and the relation existing between total capital outlay and the net earnings for the year 1913-14 is evidenced by the table shown on page 79.[1]

[1] *Accounts and Papers,* Parliamentary Papers, 1913-1914, vol. xlix, "Statement exhibiting the Moral and Material Progress and Condition of India during the years 1913-14," p. 73.

Class.	Length of Line open on the 31st March, 1914.	Total Capital Outlay on Open Lines to the 31st March, 1914, including Steamboat and Suspense.	Total Number of Passengers Carried.	Total Weight of Goods Carried.	Gross Earnings including Steamboat Service.	Working Expenses including Steamboat Service.	Net Earnings including Steamboat Service.	Percentage of Net Earnings on Capital Outlay on Open Lines.
	Miles.	£	No.	Tons.	£	£	£	
State lines worked by the State. .	7,264	88,096,933	101,270,800	18,288,000	9,900,600	5,517,000	4,383,600	
State lines worked by companies.	18,810	204,811,867	262,544,400	51,362,000	27,772,667	14,134,134	13,638,533	
Branch line company railways assisted under "rebate" terms. .	1,388	5,814,200	14,927,100	1,995,000	775,800	388,400	387,400	
Branch line company railways assisted under "guarantee" terms.	32	201,467	466,300	114,000	32,333	16,200	16,133	
District Boards Lines	166	494,867	4,123,400	306,000	89,400	53,200	36,200	
Assisted Companies' Lines. . . .	2,647	12,667,333	44,999,300	5,030,000	1,621,067	722,133	898,934	
Unassisted Companies' Lines . .	74	238,600	883,300	426,000	26,733	14,400	12,333	
Lines owned by Native States and worked by Companies	1,050	3,969,533	7,818,100	629,000	384,067	204,267	179,800	
Lines owned by Native States and worked by State Ry. Agency. .	258	1,055,133	5,285,600	1,012,000	221,600	113,733	107,867	
Lines owned and worked by Native States	2,172	5,040,600	9,410,900	1,729,000	740,467	364,533	375,934	
Companies' Lines guaranteed by Native States	721	5,430,067	4,449,200	1,234,000	732,533	373,000	359,533	
Lines in Foreign Territory . .	74	1,337,000	1,539,500	488,000	93,133	52,600	40,533	
Total of All Railways, 1913–14. .	34,656	330,057,600	457,717 900	82,613.000	42,390,400	21,953,600	20,436,800	6.19
Total of All Railways, 1912–13. .	33.5,9	313,939,667	436,697,500	86,977,000	41,139,133	20,788,267	20,350,866	6.48

CHAPTER III

Some Effects of the past Development of the Means of Transportation upon the Economic Life of the People of India.

The needs of the Indian people for transportation facilities have been partially met. It is the intention in this chapter to study some of the effects of this past development of the means of transportation, in order to estimate what might be hoped for in the future when the country is more abundantly supplied with the means of conveyance.[1]

[1] In the field of economics, the use of the word "effect" is considered a dangerous one, because it frequently implies a definite and obvious cause. The student of elementary economics soon learns that while there are economic causes for definite results, yet there is usually not one cause but a diversity of causes which have produced the effect. Besides this, he finds that frequently there is an inter-action between what he has considered cause and effect, so that an effect may be a partial cause, and the cause may be, in part, an effect. In the field of transportation, the difficulty is present in both forms: what may be called an effect of the development of transportation facilities, will have been acted upon and influenced by other forces as well as the means of transportation: and there is usually a strong reflex action upon the development of the facilities of conveyance from the effects which such means of transport may have been the chief cause in producing. For example, one may say that railways have made the industrial development of a certain locality possible, or it may be said that the industrial possibilities of the locality have been responsible for the development of railways. The relation of cause and effect differs with localities and circumstances; sometimes the first statement is more nearly true than the second.

In this chapter, when certain effects are attributed to the development of transportation facilities, it is taken for granted that other causes have played their part, and because it is believed that they are minor causes, they are not discussed. In assigning the development of transportation as the chief cause, the interaction of forces is not denied.

The first outstanding effect of the development of better means of transportation is the beginning of the dissolution of the village as an economic unit. The evidence that a much wider market is gradually supplanting the old market is cumulative. In the first place, travelers who visit outlying villages are impresed with the assortment of merchandise in the little shops. An increasing amount of the goods kept by the village shop-keeper has not been produced by the village itself but has been imported from a neighboring village or city. Much of the entire stock is made up of the essentials for the maintenance of life; *viz.*, flour, *ghi*,[1] spices, rice, *gur*,[2] sugar, oils and cotton goods. Besides these, the village shop contains an increasing amount of miscellaneous goods, much of which has been imported into India from abroad. The most important of such imported goods to be found in the shops of the isolated villages, are mirrors, cutlery, matches, lamps and lanterns, sewing thread, beads, glass bangles, and general hardware. The factor common to all these goods is that they are light in weight, so that the lack of good transportation facilities has not been an insuperable barrier to importing them into the isolated villages. The importation of such merchandise of light weight is the first evidence of the dissolution of the village as an economic unit.

Furthermore, there is a strong presumption that the people of the village have been furnishing some part of the increased demand for transportation, as revealed by the increased ton-mileage of the railways from 1909 to 1915-16, as well as by the increase in distance, a ton of goods was carried. To show that passengers as well as freight have been adding

[1] ghi is the native clarified butter.

[2] gur is made in the villages from sugar cane by boiling down the juice and allowing the molasses to remain, so that the product has been called "unclarified sugar."

to the demand for transportation facilities, the unit mile-

FREIGHT-TON MILEAGE OF GOODS (*in thousands*)

1909	9,340,441	1913-14	15,623,235
1910	12,092,916	1914-15	15,225,957
1911	13,358,364	1915-16	17,157,841
1912	15,628,595	1916-17	19,825,901

AVERAGE MILES A TON OF GOODS WAS CARRIED

1909	153.37	1913-14	182.11
1910	184.33	1914-15	188.04
1911	187.44	1915-16	207.98
1912	199.15	1916-17	230.08

UNIT MILEAGE OF PASSENGERS (*in thousands*)

1909	12,364,579	1913-14	16,614,088
1910	13,432,477	1914-15	16,022,849
1911	14,372,943	1915-16	16,528,646
1912	15,318,872	1916-17	17,846,064

age of passengers for these years is also given.[1] The above figures show that the ton-mileage increased in the years from 1909 to 1916-17 by 100 per cent, and that the percentage of increase in the average distance a ton was hauled was slightly over 50. These high percentages of increase must have had a great influence upon the markets, tending to enlarge them either for production or consumption or both.

When the distribution of the population is examined, it becomes evident that the proportion of the urban population to the total is only 9.5 per cent.[2] According to the census of 1911, the population in towns and villages is distributed as follows:[3]

[1] *Indian Year Book*, 1919, pp. 222-3.

[2] *Indian Year Book*, 1918, p. 396.

[3] *Statistics of British India*, Government of India (Calcutta, 1919), vol. iv, pp. 44-45.

Under 500 people	551,897	villages
500 to 1000	107,533	"
1000 to 2000	45,841	"
2000 to 5000	14,642	"
5000 to 10,000	1,615	towns
10,000 to 20,000	485	"
20,000 to 50,000	178	"
Above 50,000	75	"

With such a large part of the total population living in the villages, the strong presumption is raised that the villages as economic units, have been greatly effected by the increased demand for transportation. This presumption is strengthened by a reference to the *source* of the gross earnings of 1915-16 from the freight traffic. Eighty-five per cent of these earnings were received for the hauling of general merchandise.[1]

Another fact in the economic situation in India leads the investigator to believe that the development of transportation is affecting the village as an economic unit; namely, the great increase in the exports and imports of the country as a whole. No student of Indian economics will deny that the chief cause for this increase has been the development of the means of transport. The following figures, covering almost the entire life of Indian railways, show the increase in the value of the nation's foreign trade (including both exports and imports).[2] The first and the last figures are based on averages for three years, and the remaining on averages for five years.

[1] *Statistics of British India*, Government of India (Calcutta, 1918), vol. i, p. 197.

[2] *Review of the Trade of India in 1916-17*, Parliamentary Papers, 1918, pt. i. The figures are taken from a chart facing page 1. Because they have been taken from a chart, they are only approximately correct.

1866-69	Rs. 83 crores	1889-94	Rs. 178 crores
1869-74	90 "	1894-99	183 "
1874-79	100 "	1899-1904	210 "
1879-84	128 "	1904-09	285 "
1884-89	150 "	1909-14	375 "
	1914-17 ..... Rs. 356 crores		

The chief significance of these figures, relating to the village as an economic unit, lies in the fact that the bulk of India's exports is agricultural produce and raw materials, mainly unmanufactured, which are produced in the villages. The actual figures showing the value of the various articles of export and import for 1916-17 are as follows: [1]

	Exports	*Imports*
1. Food, drink and tobacco	£37,552,511	£18,164,971
2. Raw materials and produce and articles mainly unmanufactured	£65,866,951	£ 6,678,261
3. Articles wholly or mainly manufactured	£50,562,704	£72,974,603
4. Miscellaneous and unclassified	£ 1,453,555	£ 1,930,178

It is obvious from the above figures that India, through the development of transportation, has a contact with the outside world, which, with normal growth, will tend to destroy the economic independence which the village has had. This foreign trade is affecting both the production and the consumption of the village people. As to consumption, the amazing manner in which articles of light weight find their way into isolated villages, has already been mentioned.[2] But besides these articles of a miscellaneous character, the staple commodities, upon which the ordinary standard of living depends, are rapidly increasing in those villages which are within reach of the means of transport. Yarn and textile fabrics form 40 per cent of the total value of the imports into India, and foreign cotton goods are found on the

[1] *Tables relating to the Trade of British India*—1912-13 to 1916-17, Parliamentary Papers (London, 1919), pp. 7, 13.

[2] *Cf. supra*, p. 81.

shelves of the majority of the dealers in the towns and villages. The quantity of imported sugar accounts for another 10 per cent of the total value of imports. The proof that the £10,300,000 spent for foreign sugar is influencing the village consumption lies in the effect of the competition of the foreign sugar with the native *gur*. Cheap foreign sugar has so influenced the consumption of *gur* that students of village life fear that the present taste for *gur* will die out, and the production of sugar cane in India will be endangered.[1]

That India's foreign trade is affecting the production of the village is brought out so clearly in the "Report of the Indian Industrial Commission-1916-18," that one paragraph will be quoted in full.[2]

Turning in the first place to the rural areas, we find an increasing degree of local specialization in particular crops, especially in those grown for export. Cotton is now no longer planted in small patches in almost every village where conditions are not absolutely prohibitive, but is concentrated in areas which are specially adapted to its various types. The dry plains of central and western India are admirably suited to a short-stapled but prolific kind; while the canal-fed zones of the Punjab, the United Provinces and Sind are producing an increasing quantity of longer-stapled types, which are also grown in the retentive soil and moister climate of Gujarat and in the well-irrigated areas of Madras. The peculiarly favourable climate of Bengal has tempted the ryots to extend their jute cultivation, often at the expense of their foodstuffs, while sugarcane is disappearing from tracts not specially suited for it. A visible sign of this movement may be seen in the abandoned stone cane mills lying near villages in the arid plains of Central India,

[1] *Vide Indian Year Book*, 1918, p. 306.

[2] *Report of Indian Industrial Commission*, 1916-18, Parliamentary Papers (London, 1919), p. 8.

which now prefer to keep their scanty stores of water for other crops and pay for their sugar by the sale of their cotton. The people have been led to make this change by the cheap railway and steamer transport, and by the construction of roads, which, while facilitating the introduction of foreign imports, also render available to the farmer in his distant and land-locked village a large share of the price offered by far-off nations for articles which once merely supplied the needs of Indian rural life. Markets have sprung up on or near the railway, where the foreign exporters or the larger Indian collecting firms have their agencies; and the ryot is now not far behindhand in his knowledge of the fluctuations in the world-prices of the principal crops which he grows.

It is evident, therefore, that the development of the means of transportation has rendered the Indian village less independent as an economic unit, than it was in past generations.[1] This widening of the markets, with the concomitant changes in consumption and production, might be considered the national beginning of an industrial revolution.[2]

The second outstanding effect of the expansion of the means of transportation follows naturally from the breaking-up of the economic self-sufficiency of the village: prices tend to move toward equality, both with reference to different times in the same place, and to different places at the same time. In short, the introduction of the means of transport brings equalization of prices, both locally and temporally. Under ideal conditions, the difference in prices of a com-

[1] "The development of the means of communication is perhaps the most important economic event of the nineteenth century, and the multiplication of metalled roads and railways is alone sufficient to explain the break-up of the old industrial organization, in which every village in India was self-sufficing." Morison, Sir Theodore, *The Industrial Organization of an Indian Province* (London, 1906), p. 215.

[2] *Cf.* Cheney, Edward P., *An Introduction to the Industrial and Social History of England* (Chautauqua Press, 1910), pp. 153-4.

modity in two places should not be more than the cost of getting the commodity from one place to the other. Regarded from the social-benefit point of view, both of these forms of equalization of prices indicate an economic situation which is highly desirable: it benefits man both as a producer and as a consumer.

Such a levelling of prices has taken place in India, when two places have been connected with effective means of transportation. Long before railways were introduced into India, the following table was complied, and shows the variation of prices in two places about 500 miles apart: [1]

	Cost per ton.		Difference.	Percentage of difference.
	In Berar.	At Coringa.		
Rice	124 Rs	45 Rs	79 Rs	175
Cotton	186	325	139	75
Wheat	31	66	35	113
Salt.	105	30	70	200

The effect of the introduction of railways upon the variation in prices in different places at the same time, can be seen very clearly from the following table of prices in Burma: [2]

[1] *Vide* Cotton, Lt.-Col. A., *Public Works in India* (London, 1854), p. 93 Lieut.-Colonel Cotton quotes the table from a paper read by Mr. Ashburner before the Asiatic Society in 1837. Berar is in Central India and Coringa is on the Eastern coast at the mouth of the Godaveri River. It will be noticed that Mr. Ashburner, in working out his percentages of the differences has favored round-numbers.

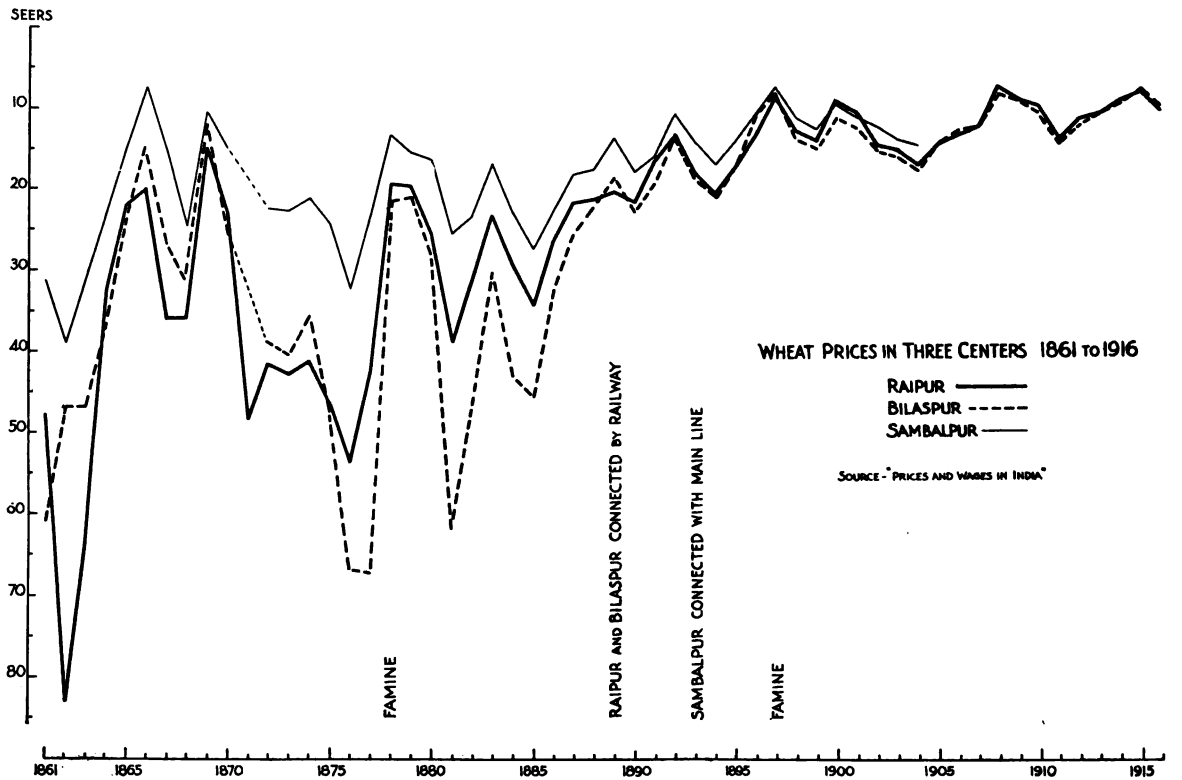
[2] *Prices and Wages in India*, Government of India (Calcutta, 1893), pp. 10-11. The attention of the author was called to the list of prices given in the second and third columns, by Mr. A. S. Tostlebe, M. A., Instructor of Economics in the University of Vermont. Mr. Tostlebe happened to be reading the lists of prices in different places in Burma,

(Wheat prices in *seers*[1] per rupee) Year	Rangoon	Prome	Difference	Percentage of Difference	
1861	12.95	4.29	8.66	201.8	The average
1862	12.95	4.52	8.43	186.5	
1863	12.02	4.20	7.82	186.1	percentage of
1864	11.07	4.29	6.78	158.0	
1865	11.55	4.03	7.52	186.6	difference
1866	12.08	4.29	7.79	181.5	
1867	12.02	6.34	5.68	89.5	until the in-
1868	12.02	6.24	5.78	92.6	
1869	12.08	6.05	6.03	99.6	troduction of
1870	11.07	6.43	4.64	72.1	
1871	——	——	——	——	railways in
1872	——	——	——	——	
1873	9.04	——	——	——	1877 was
1874	9.46	——	——	——	
1875	17.86	34.54	16.68	93.3	129.2
1876	26.34	27.16	.82	3.1	
1877	The year when the two places were connected by railway.				
1878	9.01	7.62	1.39	18.2	The
1879	8.39	7.09	1.30	18.3	
1880	9.83	7.12	2.71	38.0	average
1881	13.98	11.26	2.72	24.1	
1882	14.13	14.13	0.00	00.0	percentage of
1883	13.33	11.07	2.26	20.4	
1884	14.25	13.57	.68	5.0	difference
1885	18.31	17.69	.62	3.5	
1886	13.43	12.58	.85	6.7	after railways
1887	10.53	12.06	1.53	14.5	
1888	11.08	9.84	1.24	12.6	were built was
1889	10.73	10.85	.12	1.1	
1890	7.49	10.81	3.32	44.3	16.5
1891	8.19	11.46	3.37	41.1	

The above table also shows in a general way that the year-to-year prices in Prome fluctuated less after the railway was built than was the case before the line was opened. The

and concluded, without any additional knowledge on the subject, that a railway must have been opened between Rangoon and Prome in 1876. The Irrawaddi section of the Burma Railway between the two places was opened in 1877.

[1] A *seer* is the approximate equivalent of two pounds.


SEERS
10
20
30
40
50
60
70
80
1861
1865
1870
1875
1880
1885
1890
1895
1900
1905
1910
1915
FAMINE
RAIPUR AND BILASPUR CONNECTED BY RAILWAY
SAMBALPUR CONNECTED WITH MAIN LINE
FAMINE
WHEAT PRICES IN THREE CENTERS 1861 TO 1916
RAIPUR
BILASPUR
SAMBALPUR
SOURCE - "PRICES AND WAGES IN INDIA"

average of differences from year to year in the eleven years (for which prices are quoted) before the introduction of the railway connection is 3.58 *seers* per rupee.[1] For the fourteen years after 1877, the year-to-year variation in prices averages only 2.06 *seers* to the rupee. Because of the inability to procure the prices of wheat in Prome from 1871 to 1874, conclusions can not be drawn as positively as would be the case of the list were complete. The figures raise the presumption that the railway connections tended to reduce local and temporal variation in prices.

The chart facing this page shows even more clearly the effect of the introduction of railways upon the equalization of prices. The prices of wheat are shown from 1861 to 1916, as obtained in the three centers, Bilaspur, Raipur and Sambalpur.[2] The towns all lie in the Central Provinces. The distance between Bilaspur and Raipur is 68.52 miles. The two places were connected by the main line of the Bengal-Nagpur Railway in 1889. Sambalpur lies off the main line at a distance of 30 miles. A branch was built, connecting this city with the main line in 1893. Sambalpur is 126.8 miles distant from Bilaspur. The tendencies to temporal and local equalization of wheat prices after the lines of railway were built is evident from the chart. As a study of the chart would lead one to believe, the three towns passed through two hard famines.[3]

The indication of an isolated and narrow market in India

[1] From a statistical point of view, this average is not a fair measure of the stability of prices before the railway was built, because of the great influence exerted on the average by the very large fluctuations of 1875 and 1876. On the other hand it is a fundamental point of this argument that with railway connections with the outside world, such great fluctuations can not occur.

[2] *Prices and Wages in India*, 1893, 1918.

[3] *Cf. infra*, p. 95.

is the variation between the harvest and market prices. The former is, as the name signifies, the price at which the grain sells at the time when the crops are gathered. The latter is the average price at which the grain has sold throughout the year. If the crop is not composed of perishable goods; if the farmers are free agents and are able to sell their produce to the highest bidder; if they are well informed and alive to their own advantage; and if there is a wide market in which the goods can be sold, then there should not be much divergence between the market and the harvest prices. But in India, this difference between the two prices has been great, especially before the introduction of railways.[1] The chief cause has not been the ignorance or indifference of the ryot, but rather the small market which tends to place him at the mercy of the *baniya*,[2] who has, until the advent of co-operative societies and better means of communication, enjoyed double monopoly: that of advancing money to the farmers at a very high rate of interest, and that of being the only bidder for the harvest when it was gathered. The past history of the Indian farmers has shown that an abundant harvest could be almost as disastrous as a poor harvest. With reference to this point, Mr. K. L. Datta says:[3]

Before the advent of railways, in remote areas, whenever production was plentiful, prices went down very low because of the difficulty and, in many cases, the impossibility of transporting it profitably to a place where prices were higher. On the other hand, whenever the crops failed, prices rose exceptionally high owing to the difficulty of importing supplies from the out-

[1] This point has been splendidly verified by the facts and statistics brought forward by Sir Theodore Morison in his book, *The Industrial Organization of an Indian Province*, pp. 215-229, 235-238.

[2] The *baniya* is the village shop-keeper as well as the money-lender.

[3] Datta, K. L., *Enquiry into the Rise of Prices in India*, Government of India (Calcutta, 1914), vol. i, p. 78.

side. Railways have now linked up different parts of the country and have constituted it into, as it were, one market. . . . It was most interesting in our local enquiries to observe how a general leveling of prices was taking place throughout the areas intersected by railways and also how local prices are now-a-days greatly affected by prices in distant parts of the country.

FAMINE PRICES

The effect of the growth of the means of transport upon prices is seen most clearly in famine times.[1] If there is a strong tendency toward equality of prices in times of shortage of food supplies, then there is reasonable proof that supplies have been able to flow from the places of greatest abundance to the localities of greatest need. Such a flow of goods can not occur where the means of transportation are inadequate.

A famine occurs where the productive operations of a locality have been interrupted, so that there is a shortage of the means of subsistence. In India, the most common cause of famines in the last century has been the failure of the rain-fall at the monsoon period, so that the cultivation of the soil becomes impossible. Because the country is chiefly dependent upon agriculture, the distress resulting from droughts is much greater than would be the case if industry were more diversified. The effects of the failure of the monsoons is still furthur intensified because agriculture does not yield a flow of goods but a seasonal return. The suffering and mortality which have resulted from past famines have been due in part to the inability of the people

[1] This discussion of the contribution made by the means of transport toward the relief of suffering and death, is not meant to be a treatment of the entire subject of famines in India. Here we are concerned with the possibility of a fairly even distribution of the nation's production of the necessities [and a resulting tendency toward equal prices] in famine times.

to accumulate a surplus of supplies or money, which would tide them over to a more productive season. The consensus of opinion of different famine commissions and others has been that the Indian ryots have not stored large quantities of grain when seasons were favorable, and so avoided want in time of scarcity. Theodore Morison draws his conclusion on this point from statistical studies of the prices of food-grain in the United Provinces. He says:

> The fluctuations in the price of food-grains before 1861 further prove beyond a doubt that large stores of grain were not kept in those days from one harvest to another. Had large stores of grain been in existence, some portion of them would have been attracted to market by high prices, and so the rise would have been checked. This was clearly not the case; the most striking characteristics of the prices from 1804 to 1861 is their sudden and violent fluctuations.[1]

The assistance rendered to famine-stricken areas by improved means of transport has been a gradual process. Before effective means of transport existed, it sometimes happened that people of wealth died of starvation, not because they did not have money, but because they could not buy food at any price. For example, it is reported that in the famine of 1344-45 in the Deccan, "the emperor Muhammad was unable to obtain the necessities for his household."[2] This situation has passed away throughout India. People who have money are able to buy grain. The next stage in the assistance given in famine times by means of transportation is marked by the presence of grain in limited quantities in places of scarcity, so that the rich are able to buy, but there is little local or temporal equalization of prices. Examples of this stage are still to be found in towns and

[1] Morison, Sir Theodore, *op. cit.*, p. 296.

[2] *Cyclopaedia of India, op. cit.*, vol. i, p. 1072.

villages which are isolated, and unconnected with lines of transportation. The final stage is that to be found today in localities which are closely linked up with distant parts of the country, by improved facilities of communication and transport, so that the difference in the prices of the famine-stricken areas and of those where grain has been produced in abundance is not much greater than the cost of transportation and middlemen's profits.

The means by which the Government of India has valiantly striven to mitigate the suffering and disaster of famines might be summed up under the following heads: (1) The extension of irrigation, so that the people may be independent of the monsoons at least, for a time. Much splendid relief has been rendered by the extension of irrigation; *i. e.* the building of the great canal systems, tanks and wells. It is, however, a generally accepted conclusion that India can never hope for a complete solution of the problem of famines through irrigation.[1] Morison says,

> . . . within certain areas artificial irrigation has been highly successful; the survey shows no less clearly the inevitable limitations of artificial irrigation. The day does not seem to be near at hand, in India or anywhere else, when agriculture can be rendered altogether independent of the weather.

While irrigation canals, wells and tanks can never remove the danger of crop failure from the whole of India, yet the localities in which artificial irrigation exists have been able to furnish a limited amount of food for the people living in the areas of scarcity. In this way, irrigation and transportation have rendered a joint service.

(2) The Government relief works, which have been undertaken in famine times, have furnished employment to laborers who were unable to buy food because they were out

[1] Morison, T., *op. cit.*, p. 284.

of work. The wages paid have been so low that those employed on the relief works have been glad to get back to their regular employment as soon as economic conditions improved.

(3) Gratuitous relief has been given by the Government to those unable to work, and whose relatives were not able to support them during the famine. The famine codes usually provide for five classes of persons who are to receive aid under this heading: "(a) idiots and lunatics, (b) cripples, (c) blind persons, (d) all who from age or physical weakness are incapable of earning a living, and (e) all persons whose attendance on the sick or on infant children in their homes, is absolutely necessary."[1] Certain districts in Bombay Presidency were affected by both the famines of 1876-77 and of 1896-97. In the former famine, the daily average, during 12 months, of the persons receiving gratuitous relief was 32,908.[2] In the famine of 1896-97, the daily average of those receiving free aid in the same districts during twelve months was 36,024. Making no allowance for differences in the intensity of the two famines and differences in the density of population, it would seem that there had been little change in the policy of gratuitous relief during the twenty years.

(4) By far the most important service rendered to famine-stricken areas has been through the introduction of effective means of transportation. We are not concerned whether the building of roads and railways was due to commercial or philanthropic considerations; the fact remains that those localities which for natural or artificial causes have

[1] *Vide Reports of Commissioners,* Parliamentary Papers, 1899, vol. xxxi, "Report of the Indian Famine Commission, 1898," p. 283.

[2] *Vide Reports of Commissioners,* Parliamentary Papers, 1899, vol. xxxii, "Report of the Indian Famine Commission, 1898," appendix, vii, pp. 207, 208.

escaped the famine, have been able to ship their surplus into the areas where shortage existed, and so have reduced the distress and mortality. Before the introduction of railways into India, it was impossible to distribute the surplus production over the areas of scarcity, so that it frequently happened that the prices of grain in localities where crops had been abundant were very low, while in an adjoining territory, the prices were prohibitive. In districts well supplied with effective means of transportation, there is now no great variation in prices of food-stuffs between localities which have had normal harvests and others which have experienced a complete failure of crops. It was to achieve this result that some of the railways in India were originally built: they were planned and built as protective lines. If the railways of India had produced no other result than that evidenced by the equalization of prices in localities of varying productive power, their existence would have been amply justified.

The chart facing page 89 has an interest apart from general prices; the three towns in which the statistics were gathered were in the affected area of two intense famines—that of 1876-77 and that of 1896-7. In the interim railways were built connecting the three places. The effect of the railway connections upon the varying prices of wheat in the three places is manifest when the variations in prices of 1898 are contrasted with those of 1876. In the earlier famine the lowest price of wheat was 21.7 *seers* to the rupee and was to be had in Bilaspur; in the same year the highest price of the three localities, 13.3 *seers* to the rupee, was to be found in Sambalpur. The difference between the two was 8.4 *seers*, with Raipur furnishing a price which represented about one third of the variation measured from the lower price. In the famine of 1896-97 the lowest range is found in the Raipur price, and the upper range in the price at

Sambalpur. Here the extent of the variation between the highest and the lowest price was only one *seer* to the rupee. It is evident, therefore, that the range of variation in the earlier famine, when railway connections between the three localities did not exist, was more than eight times as great as that during the famine of 1896-7, when good railway connections had been established.

This tendency of the price lines of different localities to draw together and to fluctuate in the same direction and within narrow limits, is due to the more equal distribution of the entire produce of the communities, joined by modern means of transport; so that the supply is in that equilibrum with demand which results in comparative satisfaction to both producers and consumers. This does not mean that India as a whole is free from the distress and disease which are attendant upon famines. A beginning has been made of which any administration has a right to be proud. But after all, literally thousands of villages and towns in India are far from a railway, or metalled road. Until these villages are linked up with the systems now connecting the larger cities, local and temporal variations in prices will continue to be great.

The third consequence of the betterment of the means of transport is the beginning of large-scale production in what might be called the fundamental manufactures of India. Other factors besides transportation have entered in to make possible this beginning of modern industrialism; but as past conditions are compared with the present, the most obvious change that has occurred has been the widening of the markets, through better means of transport, which is the *sine qua non* of division of labor and large scale production.

The Industrial Commission under Sir T. H. Holland which made its report in 1918 has canvassed the difficulties that India must overcome before the nation will be able to develope industries, other than agriculture. The report says:

The list of industries, which, though their products are essentially alike in peace and war, are lacking in this country, is lengthy and almost ominous. Until they are brought into existence on an adequate scale, Indian capitalists will, in time of peace, be deprived of a number of profitable enterprises; whilst in the event of a war which renders sea transport impossible, India's all-important existing industries will be exposed to the risk of stoppage, her consumers to great hardship, and her armed forces to the gravest possible danger.[1]

The Commission took its stand on indisputable ground: India must overcome these difficulties and for the sake of her own prosperity must manufacture from her own materials, with her own machines, many of those commodities which are now imported from abroad. The report then devotes much space to plans for Government assistance and encouragement of indigenous industries. The conclusion left in the mind of the reader must be that apart from such Government aid, there is little prospect of India's development along industrial lines. Everything that the Government can do to stimulate the growth of factory production, should be done. But the statistical facts which show the trend of development during the years between 1905 and 1915 should not be considered discouraging. Almost no progress seems to have been made in producing factory machinery all of which is imported.

Regarded from the point of view of both the demand for finished commodities and also the supply of raw materials, the essentials which India would naturally produce (aside from machinery mentioned above) would include: cotton goods, sugar, coal, steel, jute, yarn, paper, printing, woolen goods and prepared rice. The figures given below, relating to Indian industries, include only those factories which em-

[1] *Report of the Indian Industrial Commission, op. cit.*, p. 50.

ploy a daily average of fifty persons or more. The first table shows both the number of factories and also the number of workers employed in the different years.[1]

Commodities	*1906-7*	*1913-14*	*1914-15*	*1915-16*	*Increase in percentage of no. employed 1915 over 1906*
Cotton Mills	197	239	233		
No. Persons Employed	197,980	244,002	240,719	271,913	37%
Jute Mills	44	64	70	70	
No. Persons Employed	166,895	216,288	238,274	254,143	52%
Woolen Mills	5	6	6	5	
No. Persons Employed	3,162	3,754	4,263	6,074	92%
Paper Mills	7	8	9	9	
No. Persons Employed	4,421	4,597	4,562	4,665	5.5%
Sugar Factories	19	25	29	27	
No. Persons Employed	5,056	6,172	8,558	7,545	49%
Cotton Gins, Cleaning & Pressing Mills and Factories	1,005	1,389	1,300	1,345	
No. Persons Employed	79,689	112,709	106,167	108,298	35%
Jute Presses	124	120	130	125	
No. Persons Employed	23,407	30,953	26,883	26,305	12.3%
Tile Factories	69	177	164	195	
No. Persons Employed	13,882	21,678	22,217	25,566	82%
Iron & Brass Foundries*	75	41	62	46	
No. Persons Employed	25,828	21,712	27,244	23,433	—9.2%

* Including Government Works.

The following figures relating to minerals show quantities produced in different years.[2]

	1907	*1913*	*1914*	*1915*	*Percentage increase 1915 over 1907*
Coal (Tons)	11,147,000	16,208,000	16,464,000	17,103,000	53%
Petroleum (Gals.)	152,045,000	277,555,000	259,342,000	287,093,000	88%
Iron Ore (Tons)	68,729	370,845	441,674	390,271	467%
Tin Ore (Tons)	1,584	3,412	5,395	8,629	445%

[1] *Statistical Abstract Relative to British India*, Parliamentary Papers (London, 1918), no. 51, pp. 233-4.

[2] *Vide Statistics of British India*, Government of India, vol. i, "Commercial Statistics" (Calcutta, 1918), pp. 82, 83.

In spite of this array it must be understood that the industries of the country have lost ground—rather than gained—in the years between 1906 and 1916. The figures above show that large gains have been made in what might be called large-scale production, but these gains do not offset the losses due to the cessation of some domestic or small scale production which has not been able to stand against foreign competition. Yet, as already pointed out,[1] this destruction of household industry must be considered inevitable, as soon as the localities are traversed by lines of metalled roads and railways, for even if foreign competition is artificially barred, large-scale production which has already begun in India, should, in future time, be able to undersell domestic producers.

[1] *Cf. supra*, pp. 18, 19.

CHAPTER IV

India's Need for Transportation

Chapter II contained an account of the extent to which the means of transportation have been developed in India. Some economic changes have occurred which are indicative of an industrial revolution, or at least, an industrial evolution, which seems already to have begun. In the chapter just closed, it was pointed out that these changes were due, at least in part, to the better means of transportation, which the country now enjoys. The question naturally arises whether the country is not already sufficiently supplied with roads, water-ways and railways, in consideration of the backwardness of the country's industrial development, and in consideration of the poverty of the people. In this chapter, an effort will be made to apply certain theoretical conclusions drawn in Chapter I to Indian conditions, with the hope that some light may be thrown on the question as to whether the policy of the future should be one of retrenchment or of expansion.

(1) *The elasticity of demand for the transportation of goods in India, with special regard to the poverty of the people.*

It has been pointed out in an earlier chapter [1] that the de-

[1] *Cf. supra*, p. 24, *et seq.*

mand for transportation of freight is dependent upon the demand for goods, and that the elasticity of demand for particular goods reacts accordingly on the elasticity of demand for transport. As the cost of transporting goods constitutes one of the elements in determining the price at which goods are offered to the consumers, conveyance charges play a part in determining the quantity demand for goods.

The demand for freight transportation has varying degrees of elasticity according to the operation of factors already discussed.[1] It has been pointed out that the poverty of the people of a community tends to increase the responsiveness of their demand for quantities of goods at varying prices. Where the standard of living is low and the surplus of the people is very limited, the demand for necessities, even in normal times, has a considerable degree of elasticity. This is the case in India, especially in times of scarcity. Other forces which usually affect the elasticity of demand tend to weaken and become ineffective wherever indigence exists. Any improvement which lowers the price of food grains in these areas will bring about an increase in the quantity of goods demanded. In so far as transportation plays a part in supplying the needs of the people in the areas where production is low, the decrease in the cost of conveyance of goods will tend to bring about an increase in the quantities of necessities consumed.

Regarded from the point of view of what has actually happened in the case of railway rates, we find that there has been a gradual lowering of the average freight rate per ton mile during the years between 1890 and 1911.[2]

[1] *Cf. supra*, p. 25.

[2] *Vide* Datta, *op. cit.*, pp. 78, 79.

THE RAILWAY MILEAGE AND THE AVERAGE RATE CHARGED PER TON PER MILE FOR YEARS 1890 AND 1911

	1890	1911	Percentage of increase or decrease
Railway Mileage	15,865	31,268	+ 95
Quantity Carried (*In Millions of tons*)	23	71	+208
Ton Mileage (*In Millions*)	3,509	13,358	280
Average Miles carried	155.18	187.44	20.8
Total Earnings in lakhs of rupees	130	329	153
Average Earning per ton in rupees	5.74	4.62	24
Average rate charged per ton per mile	7.11	4.73	−50

The mileage in 1911 was about twice that of 1890, but the quantity of goods carried, more than trebled, while the average distance a ton of goods was carried increased by one fifth. The average rate charged per ton per mile decreased from 7.11 to 4.73, which decrease is both a result and a cause: the rates have been lowered because the increased quantities of goods to be carried for longer distances have made it possible; and the gradually reduced rates have encouraged the people to use the railways.

Therefore, in so far as the reduced rates have increased the flow of goods to places of special scarcity, and have reduced the prices of necessities, the evils of poverty have been mitigated.

A study of the poverty of India cannot be limited to the subject of consumption; the majority of those engaged in agriculture are not employees but entrepreneurs. Wherever modern means of transport have touched the village, the poverty of the ryots has been decreased. Sir Fredrich Nicholson says of Madras Presidency, in referring to the

days before the building of the Madras Railway: "Grain could not be moved, so that prices depended upon local scarcity or abundance, with the result that substantial ryots were no worse off in bad years than in good . . . . in good years, especially if consecutive, the markets were glutted, and the ryots who were compelled to sell in order to meet the Government and other demands were ruined by their own superabundance." [1]

All that has been said in a theoretical way regarding the producer's demand for transportation in general and the demand of the producer of perishable goods in particular,[2] applies to India as accurately as to any other country.

(2) The character of India's produce and the need for transportation.

The character of the goods which compose the bulk of the nation's produce tends to render the need for effective transportation facilities even more powerful; India's output—chiefly agricultural and raw products—has much bulk or weight in proportion to its value.[3] Until manufactured goods comprise a larger proportion of the total national dividend, the costs of transporting goods from the place of origin to the place of consumption will continue to be an important item in determining the supply price. Therefore, under competitive conditions any improvement in the means of conveyance will affect more favorably both producers and consumers than could be the case, if transportation played a less important part in determining values. This characteristic of much bulk to small value has an intensified influence in India where "distances are great."

When we regard capital goods apart from commodities in

[1] Quoted by Datta, *op. cit.*, p. 80.

[2] *Cf. supra*, pp. 34-36.

[3] *Cf. supra*, p. 28, *et seq.*

general, it is obvious that the basic materials from which modern industry is brought into being, are usually goods of considerable bulk to relatively small value. If India is to become a great industrial nation, either the industries must create adequate means of transport or they must be supplied to make such industry possible. If the latter is the case, then there can be little doubt that an industrial life—so much needed as a complement to agriculture—will more quickly come into existence.

(3) *The conditions on which the quantity demand for transportation depends.*

It has been pointed out that the quantity demand for transportation is influenced by four factors:[1] the density and distribution of population, the intensity and variety of wants, the effect to which territorial division of labor is in practise in production, and the extent to which the production system demands that capital and labor shall flow to the places which yield the greatest return.

Applying these factors to Indian conditions, we find that according to the census of 1911, the density of the population was as follows: one-fourth of the population lived on one-twentieth of the total area, having about 600 persons to the square mile; two-sevenths of the population lived on one-eight of the total area with 300 persons to the square mile; and less than one-half of the population lived on about four-fifths of the area.[2] In spite of the fact that vast tracts of the soil of India cannot support life, yet there can be little doubt that if the population were distributed according to the relative distribution of resources, the standard of living of the average man would be greatly raised. The

[1] *Cf. supra*, p. 40, *et seq.*

[2] *Vide* Wattal, P. K., *The Population Problem in India* (Bombay, 1916), p. 44, *et seq.*

population is very immobile.[1] and even in famine times there has not been the movement of people one would expect.

Mr. Wattal calls attention to the fact that there is little correlation between the size of the holding and the per capita rate of return, for so much depends upon the "quantity and quality of the crop."[2] The return to the Bengalee is greater than to the Biharee even though the latter has an average holding of 1.2 acres while the former has only three-fourths of an acre.

But in spite of the varying degrees of density of population and the wide variation in soil qualities, the per capita quantity demand for goods transportation has remained small. The great increase in the freight ton mileage between 1909 and1916-7 has been noticed.[3] The future will probably show continual increases in the quantity of goods carried on the railways. But for the present, relative to the 320 millions of population, the quantity demand must be considered small.

The reasons why the per capita quantity demand for transportation is small are to be found in the absence of the other factors mentioned above: A wide variety of wants and a high standard of living; a territorial division of labor and a free flow of labor and capital to the localities which would yield the largest returns.

The low standard of living has been described,[4] as well as the extent to which modern industry has been developed by the mobilization of capital and labor.[5] It is evident that

[1] In the census of 1901, less than ten per cent of the entire population were enumerated outside of the district of birth.

[2] Wattal, *op. cit.*, p. 47.

[3] *Cf. supra*, p. 82.

[4] *Cf. supra*, p. 10, *et seq.*

[5] *Cf. supra*, p. 96, *et seq.*

while progress in factory production has been made in the last decade, India is still an agricultural country. As to the territorial division of labor, from the evidence that the village as an economic unit has only begun to break up,[1] it is clear that geographical division of labor has not been carried into extensive practice.

But it is just as evident that a real beginning has been made in buying and selling in wider markets, and that in those localities which have been opened by modern lines of transport, the wants of the people are being changed and increased. Factory production has already passed beyond the experimental stage. Whether these changed conditions be regarded as causes of improved transportation facilities or the results of such improved means of conveyance,[2] the truth of the assertion that the future must see a great extension or roads and railways cannot be doubted.

(4) *India's demand for passenger transportation.*

When railways were first considered for India it was thought that they would not be greatly used for passenger transportation and that therefore, the income from them would, by necessity, come almost wholly from freight traffic.[3] This opinion was doubtless due to an over-emphasis upon the force of caste restrictions, and a belief that while the people might entrust their goods to this strange demon—the steam-engine—they would surely not entrust their bodies to it. Time has proved this idea wrong. The people, as passengers, have used the railways from the beginning. When the Brahman enters a third-class compartment of the rail-

[1] *Cf. supra*, p. 81, *et seq.*

[2] The author is convinced that the changed conditions mentioned above are mainly results of the improvement in transportation. *Cf. supra*, ch. iii, *passim.*

[3] *Vide* Bell, *op. cit.*, p. 3.

way carriage, certain caste rules are suspended until he has reached his destination.[1] The Indian villager is not slow to utilize new inventions if there is concrete evidence that it is to his advantage to do so. The result is that the passenger earnings have continued to be one-third of the total earnings during the years from 1905 to 1915-16.[2] The average charge per passenger per mile remained about the same during the ten years—about 2.45 *pies*.[3] The number of passengers carried during a year increased from about 250 millions in 1906 to about 460 millions in 1915-16.[4]

The increase in traffic in the nine years between 1906 and 1914-15 is due to the increased amount of travel of the poorer people. The increases in the number of first and second-class passengers did not keep pace with the growth in railways. The following table shows this fact, as well as the increase in the other classes.[5]

	1906		*1914-15*		*Percentage of interest*
Mileage Open	29,097		35,285		21.3
Number of Passengers		*Average rate charged per passenger per mile (pence)*		*Average rate charged per passenger per mile (pence)*	
1st Class (000) ...	684	1.10	724	1.07	5.8
2nd Class (000) ..	3,026	.48	3,463	.52	11.1
Intermediate Class (000)	8,494	.26	12,618	.26	49.7
3rd Class (000) ...	239,391	.19	403,559	.19	68.5
Season & Vendors tickets (000) ...	19,468	.12	30,722	.12	57.8

[1] MacGeorge, *op. cit.*, p. 221.

[2] *Vide Indian Year Book, op. cit.*, pp. 233, 234.

[3] Six *pies* are equal to one cent.

[4] *Statistical Abstract for British India, op. cit.*, p. 138.

[5] *Ibid.*

The chief point of interest, when one considers the industrial future of the country, is obviously the number of people who travel in the third-class carriages. As no statistics can be obtained relative to the motives which induce people to travel on the railways, only general statements can be made regarding the reasons for the yearly increases in the number of passengers. It is the writer's belief that the great majority of the poorer people who use the railways are actuated by social or religious rather than by distinctly economic motives. The most important of these reasons for travel are the religious fairs and festivals, and marriage ceremonies. The railways have learned to expect their peak loads in passenger traffic at the times when the special festivals and ceremonies occur, and to make special provision for them. The *Indian Year Book* contains the following statement regarding the coaching traffic of the year 1915-16.[1] "The increase in the passenger traffic, during the year under review as compared with that of 1914-15, was chiefly due to the revival of traffic after the outbreak of the war, to the opening of new lines, to the movement of troops, and to fairs, pilgrimages and marriage parties." Of these causes of the increase of passenger traffic, only the last three can be called permanent; *i, e.*, "fairs, pilgrimages and marriage parties."

If it is true that the larger part of the demand for third-class train accomodation is due to motives which are not essentially economic, then we would expect this demand to possess a considerable degree of elasticity, especially as the majority of the people are far from well-to-do. The average rate charged per passenger per mile for third-class accomodation is .19 pence or about 4 mills. This rate is low, but it must be considered in its relation to the general level of prices and incomes obtaining in India.

[1] *Indian Year Book, op. cit.*, p. 234.

However, after due allowances have been made for the differences in price levels between India and western countries, the Indian third-class fare is still relatively low. The effect of a further lowering of the fare would undoubtedly bring an increase in the number of passengers, but it might not bring an increase in the net income from the coaching traffic.

Regarding the country as a whole, the future developments in the passenger traffic will not be determined by the comparatively small changes that many occur in the rates charged by existing railways, but by the increases of supply of modern means of transportation. Because of the great reduction in the cost of travel due to the greater effectiveness of modern facilities of transport over the *ekka*, the *tonga*,[1] the bullockcart and the camel-cart, the demand for passenger transportation will be greatly stimulated. The social effects will be of great importance when India comes to be a nation of people which travels for pleasure.

As modern industrial development accompanies the growth of transportation facilities, the number of passengers who travel for business reasons will be increasingly large. The two incentives for travel—business or pleasure (including religious obligations)—should make the quantity demand for passenger transportation a very important factor in determining the total demand.

[1] The *ekka* and the *tonga* are two-wheeled carts and are usually drawn by one native pony; for long distances, two horses are used for the *tonga*.

(5) *"Lardner's Law of Squares in transport and trade,"* [1] *as applied to India.*[2]

What should be the ultimate minimum of transport facilities with which India can be satisfied? We have seen that the demand for transportation increases with industrial development, and that massive production cannot occur without effective means of transport. The facilities for conveyance must grow with industry. The ultimate goal for a nation in estimating the future development of its transportation systems should be to make the nation one market for commodities of universal demand.

Marshall discusses the course of market extension as follows: "Inprovements in the mechanism or the organization of transport which increase the distance over which trade in certain goods can be carried at a given expense, are *prima facie* likely to increase in the square of that ratio, the area over which the trade can be conducted profitably." [3] To achieve the operation of the Law of Squares in transport and trade, main lines must be supplied with sufficient feeders to draw the isolated villages into the same market as those towns and cities which lie on the main lines. A beginning has been made in India to extend the influence and the benefit of the construction of the main lines, by the building of subsidary roads and railways as feeders to the main line.

But it is only a beginning. One may travel through miles of country in which agriculture is flourishing and the villages large and not see a metalled road or railway. These villages do not enjoy the advantages described above [4] except

[1] The phrase in quotation marks is used by Prof. Alfred Marshall in his recent book *Industry and Trade*. Marshall gives Lardner the credit for first making the idea prominent. *Vide* p. 27, footnote.

[2] *Cf. supra*, pp. 33, 34.

[3] *Cf. supra*, ch. iii, *passim*.

[4] Marshall, *op. cit.*, p. 27.

in a very incomplete and imperfect way. The evils of isolation are still there: inequality of prices, both temporal and local, the grip of the money lender upon the farmers, and the lack of imported articles, except those of very light weight. In famine times, these evils reach their climax, which frequently brings acute distress and mortality.

Therefore, the answer to the question, "What should be India's minimum of transport facilities?" must be that the country's demand for transportation will be met, when the area of the market in which trade and industry are conducted with profit, will increase in ratio to the square of the additional distance goods can be carried at the same cost, because of some saving or improvement in the means of transportation. The demand of the villages now isolated will thus be met, and consumers and producers will benefit by the improved connections with the outside world. The necessary foundations will be laid upon which modern industry and large-scale production may be built.

CHAPTER V

Methods of Meeting India's Need for Transportation

It is one thing to say that India must go forward with its plans for the extension of the transportation system; it is another thing to specify what form the extensions should take. The meeting of the nation's demand for transportation with an adequate supply of facilities, is a complex problem requiring the combined skill and wisdom of the engineer, the statesman and the economist. It is with some hesitation, therefore, that the writer makes proposals as to the ways and means of future development of the transportation system. In making such proposals, he will attempt to limit himself, as far as possible, to the economic aspect of the problem.

The chief need for transport facilities is in the villages. The urgency of the need for feeders of all sorts to bring the isolated areas into communication with the main lines of roads and railways has repeatedly been voiced in India. Even though the growth of industry should not now demand the means of conveyance, yet the present agricultural production requires them. Students of village conditions know, in a general way, that the means of transportation are a desideratum; but the writer is convinced that little is known of the extent of the actual losses in the districts due to isolation. The first necessity is to ascertain the actual situations in the different districts in the several provinces, with reference to the immobility of goods and men.

To rectify the insulation of the villages, we would offer

two proposals: the organization of a Department of Transportation for each province and the establishment of motor truck service for India.

PROVINCIAL DEPARTMENTS OF TRANSPORTATION

There should be created in each province a special department for the study of the problems of transportation in its territory. What form it should take, and what status it would have in its relation to the other departments, are questions for the students of Indian politics to answer. The writer believes that it would be wise to make the proposed Department of Transportation as independent as the existing Departments of Industries (in Madras and the United Provinces), the Department of Agriculture, or the organization for the control of Cooperative Societies. The proposed department should be in close harmony and unity of purpose with these three departments, but not entirely subordinate to any one of them,[1] as the welfare of all three of these departments is intimately bound up with the progress made in the development of the facilities of transport.

If the proposed department is made independent of both the Departments of Agriculture and of Industries, it should have a Director at its head and a sufficient staff of workers.

[1] That the full importance of transportation, as allied to industrial development, will not be realized, if transportation is made a subordinate division of the activities of the Department of Industries, is made evident by the meagre study of transportation problems made by the recent Indian Industrial Commission. The only place for the study of the needs of transportation under the program proposed by the Commission would seem to be in paragraph 306-(b) *op. cit.*, p. 189: "The collection and distribution of commercial and industrial intelligence; . . . the organization of markets for local products; the conduct of special enquiries and industrial surveys." This is surely general enough to provide for the possibility of a study of India's need for transport facilities; but because the provision is so broad, it does not meet the necessity of a comprehensive study of the problem.

A Board, composed of officials and non-officials, might be organized and the Director and the Board could well have such a relation to each other as that obtaining in the United Provinces in the case of the Director of Industries and his Board: "The Director should work under the orders of the local Government, but should be assisted by a Board, of which he would be the Chairman." [1]

The organization of the staff of helpers for field and office work might be similar to that under the direction of the Registrar of Cooperative Societies in the United Provinces. The staff need not be large until the occasion seems to demand more workers.

As the results of providing the means of transportation are not limited to the boundaries of any one province, the different provincial departments for transportation should be centralized in some high official, who should be a member of the Imperial Council. This official might well be the Member for Commerce.

The general duty of the Director of Transportation and his staff would be to further the development of the material resources of the country, through the use of better means and methods of marketing. Such improvements bring favorable results in both production and standards of living. The need of such an organization, the chief duty of which would be to know village conditions and to assist the small producer to buy and sell to the best advantage, is intensified because of the villager's ignorance of outside conditions. When the "Wheat Scheme" went into effect, the isolated farmer welcomed the agent who was buying for the government because it brought him in touch with an outside market.[2] The author is convinced that no new line

[1] *Vide Industrial Commission's Report, op. cit.*, pp. 190-91.

[2] For a short statement of the "Wheat Scheme," *Vide Indian Year Book, op. cit.*, pp. 731-32.

of government activity would be more profitable to both the people and the government than the one herein proposed.

In assigning definite duties to the proposed department, we would specify first of all a careful study of the existing conditions in the isolated areas. This study should cover at least the following points: (1) An examination of the standard of living with special reference to the supplies of commodities (with their prices) which are not produced in the village itself or in the immediate vicinity. (2) A study of the surpluses of production within the village and the ability of the people to find satisfactory markets. The general movement of goods should be noted, and an effort should be made to discover the reasons why these movements of goods take the direction they do. (3) An estimate should be made of the existing supply of transport facilities in each locality and their adequacy in the light of actual or potential growth in production. (4) A study should be made of the community losses due to unnecessary duplication of the means of transportation. (5) Any information which might be gathered with reference to the mobility of labor in the different districts would be of real value. Does immobility of labor increase directly with isolation? The answer to this question is of great interest to those who are concerned with the economic development of the country.

After such an examination of village conditions has been made in the different districts, certain constructive programs for the economic advancement of the provinces and the country can be undertaken. All these programs might not be carried out by the proposed department, for some other department might be more intimately concerned.

Firstly, each Local or District Board would be able to formulate its needs for transportation and to make definite

plans for meeting its own requirements. These plans would be subject to the approval of the provincial officers. Where trunk lines were concerned, involving more than one province, the ultimate approval would rest with the Government of India. But the point to be emphasized is that future expansion of the means of transport would be based on the economic facts, in so far as they could be known.

Secondly, the Department of Transportation would be able to assist the farmers in finding the best markets for their surplus produce. Purchasers would also apply to the officials for information as to the best places in which to buy. The maladjustments of supply and demand are great in the more isolated districts, where the villagers have no knowledge of the best markets either for the buying or selling of goods. After the department has been in operation for some time, it will be in a position to advise the Department of Agriculture and the Department of Industry what lines of production are most likely to prove remunerative, because of the existence of satisfactory markets.

Thirdly, such a department with an efficient staff of men who are familiar with the village conditions could render great service in the moving of goods. Cooperative marketing is still in its infancy in India. There is little regular collection of goods at the place of sale, such as is carried on in the United States. What cooperative effort exists in India is of the unorganized and more or less accidental character.[1] The result is either a wasteful duplication of men, animals and carts, or, if the railways are used, the shipping of goods in small quantities at a correspondingly higher rate. By organizing and systematizing the village demand for regular (or even irregular) transportation, and

[1] An exception to this statement is to be found in some of the Cooperative Societies, which are definitely organized for the sale of agricultural produce. They are not numerous.

by the best use of the existing supply of transport facilities, the community losses due to duplication could be reduced to a minimum. The organization would plan for full loads, in so far as possible, in carrying goods to the market and in bringing back supplies to the villages.[1]

Fourthly, a Department of Transportation in each Province would be a strong right arm for the Department of Industries. From the report of the recent Industrial Commission, and from the action of the Government of India in furnishing at least some protection for Indian textiles, it is evident that the Government is determined to further the development of industries in India. That this development of industries cannot go forward without a corresponding development of the means of transportation, has been the major theme of this study. Even if the Department of Transportation was not independent of the Department of Industries, yet the former should exist and function strongly.

Transportation has frequently led the way to the development of industries; sometimes it has followed it. In the program outlined for the industrial development of the country in the recent report, a Department of Transportation would be able to render great service. The commission plans for an extension of industrial and technical education, the development of cottage industries, the close rela-

[1] The author, in company with another teacher and a group of graduate students, stood at one end of the Jumna bridge and listed the goods that were being brought to the market at Allahabad. Notes were also made of the places from which the goods were being transported. The goods were conveyed by men, pack animals, *ekkas*, or carts drawn by oxen. Much of the goods had been brought from villages lying on or close to the Jubblepore road. A light load was not uncommon, and the duplication of animals, men and carts was very evident. In some cases it appeared that the profit on the sale would not be enough to cover the expense of getting the goods to market.

tionship between the Forest Department and industries, the use of modern engines not only for the cities, but even for the villages, and the extension of markets for Indian goods. To this list might be added a greater increase in the mobility of capital and labor, which is a necessary prerequisite for industrial growth. In all of these plans for India's economic welfare, in so far as they will reach the isolated villages, this organization which we have called the Department of Transportation would be a necessary connecting link. Any plan for the future must include the Indian village or it is not reaching India. Main lines are not enough; India must have feeders which connect the villages with the main lines. It must have a Department of Transport which will help to move village production, and bring to the village that which will increase the standard of living and make the life of the village-dweller less fraught with hardship and privation.

MOTOR TRANSPORT FOR INDIA

As a means of strengthening and increasing the country's transportation resources, encouragement should be given to the development and more efficient use of India's roads and highways over which motor vehicles can operate independent of fixed lines or terminals. Motor transport would be a valuable adjunct to the railways, particularly in areas which are productive agriculturally, but which cannot make progress on account of the lack of facilities for transportation to market.

The growth of motor transportation in Europe and America during the War has been phenomenal. In the opinion of experts, this form of transport has "come to stay" and will be increasingly important in the future. In America the service rendered to the rural areas by motor trucks has greatly stimulated and assisted production. In

the Western States alone, the trucks have moved great quantities of commodities which could not otherwise have been marketed and which would have gone to waste had this new arm of the transport service not been developed. In England and the United States rural express is being organized on a national scale with the purpose of bringing agricultural communities into easier access to the markets, the consumer into closer touch with the producer, and with the view of relieving the producer of the burden of marketing his own produce, thus permitting him to remain on the land where his labor is of the highest value to the community.

"By 'Rural Motor Express' is meant the use of the motor truck in regular, daily service, over a fixed route, with a definite schedule of stops and charges, gathering farm produce, milk, livestock, eggs, *etc.*, and delivering them to the city dealer, and on the return trip carrying merchandise, machinery, supplies, *etc.*, for farmers and others along the route." [1]

The development of such a system of transportation would be of inestimable value for India, where it seems peculiarly adapted to the needs and conditions of the country. The motor truck has proven itself adaptable to the hauling of farm products; and the people of India are, for the most part, farmers.

Good roads over which the trucks are to operate are highly desirable, but not an absolute necessity. India could use unmetalled roads for such transport more successfully than western countries because of the absence of snow, the lack of grades over her vast, level plains, and the absence of rainfall for much of the year. The country now possesses many miles of first-class roads, which are not used

[1] *Vide* Publication of the Highways Transport Committee, Council of National Defense (Washington, May, 1918), *Bulletin No. 2*, p. 2.

extensively for long hauls. These highways could be gradually extended to meet the need; while the second and third-class roads, of which the country possesses thousands of miles, would be immediately available for the lighter kinds of trucks.[1]

One of the features of this means of transport which makes it peculiarly suited to India's needs, is its adaptability to varying conditions with reference to routes, schedules and tonnage.[2] Motor-truck service could be moved from point to point with due regard to the needs of each season. The routes could be varied so as to make different villages on different days of the week, until each village demanded a daily call of the truck. The schedules could also be varied within limits, so as to suit the majority of the patrons. Emergency trucks could be put in operation at times when there was a special demand for freight or passenger traffic. To have such a service in operation would greatly reduce suffering and mortality in times of famine.

Again, the character of India's produce — much of it perishable goods—furnishes a strong argument in favor of the introduction of motor transport into the rural communities of the country. Herbert Hoover recently made the statement that fifty per cent of the perishable food produced in America goes to waste because of inadequate marketing and transport facilities.[3] It is doubtless true that the Indian farmer also suffers losses of the same kind. India's production would be greatly stimulated if there were a cheap, speedy and regular method of marketing such

[1] In some cases, a proper bridging of the streams would be necessary.

[2] *Cf.* Address of Robert C. Wright (Assistant Director, Division of Traffic, U. S. Railroad Administration) before the regional Chairmen of the Highways Transport Committee, Sept. 17, 1918.

[3] *Vide* Publication of the Highways Transport Committee, Council of National Defense, *Bulletin 40* (Jan. 14, 1919), p. 4.

perishable commodities as milk, *ghi*, eggs, fruit and vegetables. These are the essentials of the family budget, but there is much immobility of perishable goods. Motor transport circuits touching the villages would render the kind of service necessary to handle this class of produce in a more effective manner than any existing method of transportation. To make such circuits a success, however, organization and cooperation are necessary.

Before undertaking the establishment of a motor route, there should be a thorough canvass of the field of operation. A careful business survey must be made in advance to determine the necessity or desirability of starting the route at all, and to aid in formulating plans relative to the investment of funds and the selection of equipment.

"The success or failure of any rural route will be determined ultimately by four important factors: (1) The volume of farm products produced along the contemplated route; (2) the volume of miscellaneous hauling which can be secured to supplement regular loads; (3) competition from other carriers which would be encountered; (4) the character of the highways over which the trucks must be run." [1]

If the route is to operate successfully there must be a sufficient supply of commodities available for hauling. The character of the production must also be taken into account; and there must be a dependable and reasonably uniform supply for most of the year.

Consideration should also be given to the nature of the products to be hauled. Low-priced, bulky articles, such as hay, can less likely be transported with profit, for long distances, than perishable goods, or commodities like milk, *ghi*, eggs.

[1] *Vide* U. S. Dept. of Agriculture (Washington, Jan. 29, 1919). "Motor Transportation for Rural Districts," J. H. Collins.

The question of supplementary business for rural truck operators is often an important one. There are possible side lines of operation — arrangements for special hauling outside the regular schedule, business from farmers and merchants along the route, *etc.*—which often prove an important source of income to the motor-truck operator. All such possibilities should be canvassed in advance.

A question of vital importance in determining the feasibility of establishing a motor-truck route is: "What will it cost to operate a truck?". It is essential that some idea of prospective operating costs be secured, for on the basis of this estimated cost, rates will be established, the route will be planned and the truck purchased. The apparent costs are tires, gas, oil and labor. But besides these, there are the items of depreciation, maintenance, insurance and other miscellaneous figures.

The economic advantages which follow from the use of motor transport are so great that the writer feels that it would be a mistake not to strive for them. In two ways the railways would be benefited by the introduction of motor trucks as feeders. There would be a regular flow of goods from localities now isolated, to the railways, where transshipment would occur for long hauls. The amount of freight which the railways would be called upon to carry would be increased. As the fixed expense of the railways constitute, let us say 60% of the total expense, the profits to railways should be increased. Besides this real benefit to the railways, another appears which has been frequently referred to in the United States. The motor transport service would help to take the burden of the short haul off the railways. The cost of carrying a ton of goods per mile decreases with the increase in the length of the haul. Therefore the greater the average distance of the haul, the greater the net profit to the railway tends to become, if

other things are equal. It is generally admitted in America that the railways would be glad to lose the business which makes short hauls necessary. J. R. Dalton, Chairman of the Highways Transport Committee of South Dakota, writes as follows: [1]

Ours is a comparatively new state and the matter of highways transportation has not yet taken hold of the people, but it is plain to be seen that that method of transportation is bound to be adopted in this and other states in the near future. This especially applies for short hauls. The railroads are desirous of losing this short haul business as it is certainly a well known fact that such business for railroads is far from being desirable.

This applies particularly to the hauling of animals for short distances; the railway officials would be glad to see this freight go to the motor trucks. The following quotation refers to Omaha, Nebraska: [2]

Railroad men in Omaha are reported to be accepting this situation with more or less satisfaction. As a matter of fact the railroads never have favored the handling of live stock for short hauls. The time, damage claims and the cleaning of cars and other handicaps are said to have made this traffic very expensive as compared with the rates the roads are allowed to charge.

The short haul will continue to be of importance in India until the old economic organization, represented by the village as the unit, has more completely passed away. As the motor truck is especially suited for short hauls and can be easily adapted to particular community needs, it appears to be at least a partial solution of village isolation and all the evils attendant upon it.

[1] *Vide* Highways Transport Committee, Council of National Defense, *Bulletin No. 41*, pp. 2-3.

[2] Editorial, *Motor World*, March 12, 1919.

What the motor truck can do to aid in the development of backward agricultural regions is evidenced by the experience of Colorado.[1]

Out in Colorado, where highways transport means so much, great results have been accomplished by the activities of our Colorado Highways Transport Committee, and we do not know of any incident which tells of the concrete good accomplished better than that referred to in a letter from Mr. F. L. Rouse, of Colorado Springs, Colorado. A copy of this communication is given below:

"We have in this county a territory between the Rock Island and the Missouri Pacific that is rapidly being settled by farmers. This county has advanced from the homesteading primitive ways to prosperous productive farms.

The difficulty of handling over poor roads and long distances has made it very difficult to handle the crops of beans, potatoes, hogs and other farm products which are raised. The western part of the county also raises large crops of potatoes. These crops are being moved by commercial trucks which have been put in service by reason of the demand for transportation in these localities."

There seems to be no reason why India should not receive the same economic benefits which Colorado has received.

India's method of transporting goods in the rural areas is a very expensive one, when all the items of expense are included. The time element will doubtless play a more important part in the future than it has in the past. Men with their oxen-drawn carts are on the road for a day, and if the carts are heavily laden, or the road rough, ten miles is a long day's travel. The animals and the men are away from the fields or the factory, and many people cannot afford to convey goods by the very expensive methods now in use.

[1] *Bulletin, No. 41, op. cit.*, pp. 1-2.

The experience of Colorado[1] may again teach India a lesson.

In this connection the economic value of the Rural Express Service, advocated by the Highways Transport Committee has been strikingly demonstrated. Instances quoted include the service of a single operator in Colorado, who with three men covered an express route which made it possible for fifty farmers on one highway to discontinue hauling and give all their time to production. The Rural Motor Express Service marketed their farm products.

A few of the arguments which the Highway Transport Committee advances in urging the organization of Rural Express Service are, that it makes available for use, foods now produced but wasted because not marketed; it lightens the demand for labor, where labor conditions are most acute, and it stimulates increased production. It gives the producer the transportation facilities which other business has enjoyed for years past.

One of the most interesting features of the rapid development of the motor transport service during the War, both in England and America, was the establishment of the bureaus of "Return Loads."[2] To derive the greatest amount of good from the trucks, it is necessary for them to carry "return loads." To make this possible, organization is necessary. In India, this could be placed in the care of the proposed Department of Transport. If the trucks start on their daily run from a city, the city shops and factories would thus be able to extend their selling market to the villages. The isolated consumer would be able to order what he wished on one day through the driver of the truck, and he would receive his commodity the following

[1] *Vide* Publication of the Highways Transport Committee—Council of National Defense (Washington, January 14, 1920), *Bulletin 40*, p. 5.

[2] *Vide* Publication of the Highways Transport Committee, Council of National Defence (Washington, 1918), *Return Loads, passim.*

day. The monopoly privileges of the village *baniya* would be overthrown and the village consumer would be able to improve his standard of comfort, as well as to obtain what he needed for production. Therefore, it is quite possible that the village-dweller would be as much benefited when the truck carried goods to him as when it carried his goods to others.

In introducing motor-truck routes into India, the old question would again face the Government, whether the enterprise should be carried on by the state or be left to private enterprise. The author would suggest that certain selected routes be chosen in the different provinces, the surveys made, and the organization perfected by the provincial governments. These routes could be run and operated by the state as illustrations of what can be done. Private enterprise would undoubtedly follow. It would be a mistake for private enterprise to start motor transport service without the necessary study and survey. The experience in America has proved the necessity of a careful examination of all the possibilities both in expense of operation and the future receipts for the carrying of goods.

There is one thing that should be of great assistance in introducing the motor transport service throughout India—the existence of Cooperative Credit Societies. The societies should be a great help in interesting village communities in the possibilities of the service. For this reason the Department of Transportation (or whatever department of the provincial government would have it in charge) should work in close harmony with the organizations which supervise the work of the cooperative societies. There is reason to expect that the cooperative societies themselves through the District or Central Banks might become shareholders in motor-transport companies, when it has been definitely proved that motor trucks can be operated with profit and are of advantage to the communities.

In conclusion, it may be mentioned that some experts believe that the needs for transport of agricultural communities of all countries will be met in the future by motor transport rather than by railways.[1] In adopting this form of transport service for rural areas, India would be building for the future in accordance with the beliefs of students who have made a study of the comparative merits of the different forms of transport now in use in England and America.

SUMMARY OF CONCLUSIONS

The conclusions drawn from this study can be summarized in a few words. India's economic weakness lies in the paucity and inadequacy of productive enterprise other than agriculture. Industrial progress cannot be made without adequate means of transport. When these facilities for the conveyance of goods and men are supplied, industrial development will follow. But the existing economic organization — based chiefly on agriculture — demands effective means of transportation, because of the character of the nation's production, because of the poverty of the people, and because of the liability of famine. This need for the means of transportation will not be met until the villages are adequately supplied. To accomplish this it is highly desirable that a special department be created to study the needs of the village and to organize a system of transport which is adapted to rural conditions. Because of its elasticity and adaptability to varying conditions, motor transport should be one of the agencies used to connect the villages with the outside world.

[1] *Vide* Lord Montague (Brigadier-General) "Road Transport Versus Rail," *The Evening Post Magazine* (New York, Jan. 17, 1920), p. 3, *et seq.*

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